WATER GENERAL NOTES

GENERAL:

1. ALL MATERIALS AND CONSTRUCTION METHODS SHALL BE IN CONFORMANCE WITH THE LATEST EDITION OF THE "CITY OF BATTLE GROUND CONSTRUCTION STANDARDS" AND THE LATEST EDITION OF THE "STANDARD SPECIFICATIONS FOR ROADS, BRIDGES AND MUNICIPAL CONSTRUCTION" HEREINAFTER REFERRED TO AS THE "STANDARD SPECIFICATIONS" PREPARED BY THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION, EXCEPT AS NOTED HEREIN OR ON THE STANDARD PLANS. ALL REFERENCES TO AWWA AND/OR APWA SPECIFICATIONS SHALL MEAN THEIR LATEST REVISION.

2. ALL WATER LINE CONSTRUCTION IS SUBJECT TO INSPECTION AND APPROVAL BY THE CITY OF BATTLE GROUND, PRIOR TO COVER. ALL TESTING SHALL BE APPROVED PRIOR TO PAVING. THE CONTRACTOR SHALL NOTIFY THE ENGINEERING OFFICE AT LEAST 48 HOURS PRIOR TO THE START OF CONSTUCTION. A PRE-CONSTRUCTION MEETING IS REQUIRED PRIOR TO THE BEGINNING OF CONSTRUCTION.

3. ALL PIPES FURNISHED SHALL BE NEW, AND CONFORM TO THE REQUIREMENTS OF AWWA DI CL52.

4. A TRAFFIC CONTROL PLAN IS REQUIRED PRIOR TO CONSTRUCTION WITHIN A CITY OR CLARK COUNTY RIGHT-OF-WAY.

5. WHERE EXISTING SERVICE MUST BE INTERRUPTED, THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE CITY AND NOTIFY ALL CUSTOMERS AFFECTED AS TO THE DATE AND DURATION OF THE INTERRUPTION. NOTIFICATION MUST BE DONE TWO (2) WORKING DAYS IN ADVANCE OF INTERRUPTION. THE CONTRACTOR SHALL SCHEDULE CONSTRUCTION TO PROVIDE MINIMUM INTERRUPTION OF SERVICES AS DETERMINED BY THE INSPECTOR. UNDER NO CIRCUMSTANCES SHALL A CONTRACTOR SCHEDULE A WATER MAIN SHUT-DOWN WITHOUT THE REQUIRED 48 HOUR NOTICE. THE CONTRACTOR SHALL NOT OPERATE THE CITY'S WATER FACILITIES WITHOUT APPROVAL FROM THE CONSTRUCTION INSPECTOR.

6. WHEN EXTENDING AN EXISTING LINE THE CONTRACTOR IS REQUIRED TO INSTALL A VALVE AT THE END OF THE LINE IF ONE DOES NOT EXIST PRIOR TO MAKING A CONNECTION TO THE NEW LINE. THE VALVE MUST REMAIN CLOSED UNTIL THE NEW LINE HAS BEEN TESTED AND ACCEPTED BY THE CITY. AS AN ALTERNATIVE THE CONTRACTOR MAY CONSTRUCT AND TEST THE NEW LINE PRIOR TO MAKING THE FINAL CONNECTION TO THE EXISTING LINE. THE LINE MUST BE ACCEPTED BY THE CITY BEFORE MAKING THE FINAL CONNECTION.

7. CONTRACTOR TO CONTACT FIRE DISTRICT 11 AT (360) 687-2171 FOR FIRE FLOW TEST PRIOR TO ENGINEERING ACCEPTANCE.

WATER METERS:

8. ALL WATER METERS WILL BE FURNISHED AND INSTALLED BY THE CITY.

WATER GENERAL NOTES					PLAN #
THE CITY OF BATTLE GROUND	CITY OF BATTLE GROUND APPROVED CITY ENGINEER 9/24/07 DATE	REVISIONS:	DATE:	DRAWN:	DESIGNED:
		1	8/12/98	BSG	GGH
		2	8/30/05	ALL	MCH
		3	4/16/07	JMH	MCH
		4	9/21/07	MCH	MCH
					WA-1.0

1. All reduced pressure and backflow devices shall be Washington State approved.

2. Fire sprinkler and irrigation systems shall be protected with State approved backflow protection.

3. All commercial, industrial and multi-family facilities shall be protected with Washington State approved backflow protection.

4. Further backflow prevention shall be required depending on water usage, i.e. boilers, chillers, chemical addition, booster pumps, wells etc.

5. All hosebibs shall be protected with vacuum breakers.

6. If chemicals are added to the Fire Protection System, a reduced pressure principle backflow preventer is required.

7. If a well is now existing on-site or is drilled in the future, a reduced pressure backflow assembly will be required at each meter.

8. Where a vault is required, a galv. steel wall mounted chamber ladder w/extensions is required and shall be centered under the access door.

9. Double check assemblies shall be installed in either an approved vault or inside the building in a mechanical room.

10. Reduced pressure assemblies shall be installed either outside above ground or inside the building.

11. All backflow devices shall be protected from freezing.

12. Backflow prevention assembly vaults (i.e.: fire and service protection) must be installed at the customer's side of the easement or property line. Alternate locations must be requested in writing and approved by City of Battle Ground Development Engineer prior to installation.

13. No part of the backflow prevention assembly shall be submerged in water or installed in a location subject to flooding. If a backflow prevention assembly is installed in a vault or basement, adequate drainage shall be provided.

14. All fire protection services shall have a iron body gate valve at the public main and shall be private after that valve.

15. All domestic services with backflow protection shall be private after the domestic water meter.

Mail test results to:

City of Battle Ground
Operations Center
109 SW 1st Street, Ste. 122
Battle Ground, WA. 98604
Fax# (360) 342-5359

BACKFLOW PREVENTION GENERAL NOTES

PLAN #

THE CITY OF BATTLE GROUND

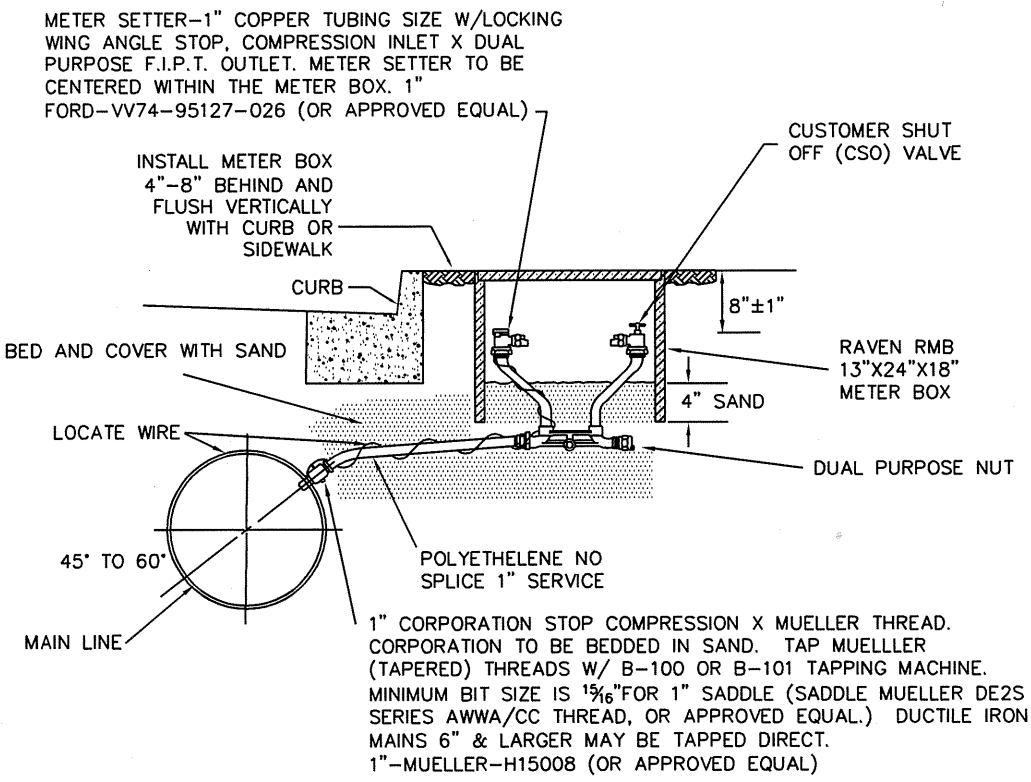
CITY OF BATTLE GROUND
APPROVED

9/24/07

CITY ENGINEER DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH
2	9/24/07	MCH	MCH

WA-1.1



NOTES:

1. ALL METERS SHALL BE INSTALLED BY THE CITY OF BATTLE GROUND.
2. PRIOR TO CITY INSTALLATION OF METERS, ALL SERVICE APPLICATIONS MUST BE COMPLETED AND APPROVED, SERVICE FEES PAID IN FULL, AND AS–BUILTS SUBMITTED AND APPROVED.
3. CONTRACTOR SHALL CONTACT CITY ENGINEERING DIVISION AT (360) 342–5071, 48 HOURS PRIOR TO INSTALLING ANY WATER SERVICE CONNECTIONS.
4. METERS WILL NOT BE SET BY THE CITY PRIOR TO DISINFECTION OF THE MAIN AND SERVICE AND PRIOR TO A SUCCESSFUL BACTERIOLOGICAL TEST.
5. USE 1" POLYETHYLENE FROM CORP STOP TO METER SETTER MIN. 18" DEPTH BELOW PAVEMENT.
6. WATER SERVICES SHALL BE PRESSURE TESTED ALONG WITH THE MAIN. DURING PRESSURE TESTING THE MAIN SHALL BE OPEN TO INSPECTION AT ALL CORPS.
7. ALL UTILITY CONNECTION APPLICATIONS MUST BE COMPLETED, APPROVED AND PAID IN FULL.
8. IF ALL THE ABOVE STANDARDS HAVE BEEN MET, YOU MAY CALL THE CITY AT (360) 342–5350 AND REQUEST INSPECTION & INSTALLATION. PLEASE ALLOW UP TO 48 HOURS FOR INSPECTION & INSTALLATION. PLEASE GIVE NAME OF SUBDIVISION, LOT #, ADDRESS AND UTILITY CONNECTION APPLICATION #.
9. LAY ONE PIECE LOCATE WIRE ALONG WITH POLYETHYLENE PIPE. CONNECT WIRE TO WATER MAIN & METER STOP.
10. METER BOX IS NOT ALLOWED IN HARD SURFACED AREAS WITHOUT PRIOR WRITTEN APPROVAL. METER BOX SHALL BE SLIGHTLY HIGHER (1/8" MAX.) THAN SURROUNDING GRADE AND MADE TO DRAIN AWAY FROM THE BOX.

1" WATER SERVICE

PLAN #

THE CITY OF BATTLE GROUND

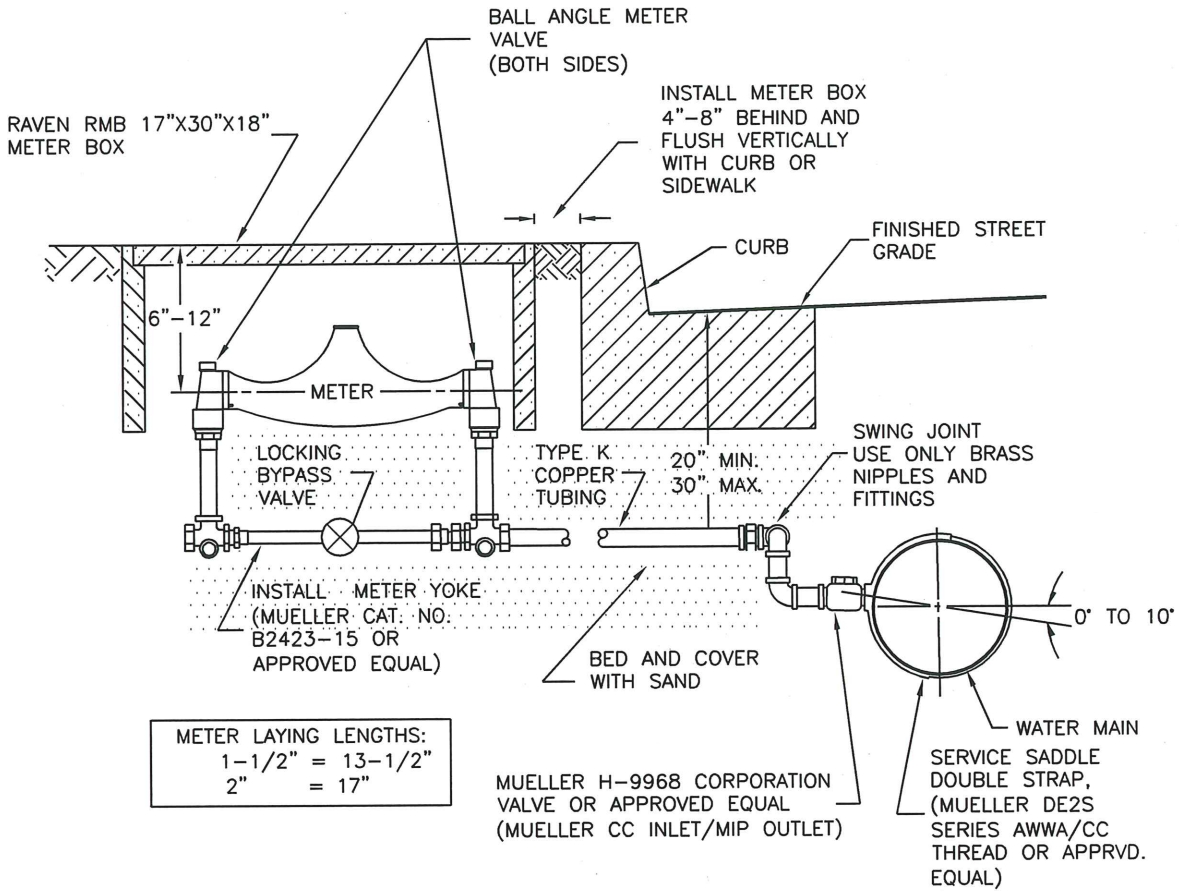
CITY OF BATTLE GROUND
APPROVED

9/24/07

CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	3/02/07	JMH	MCH
2	4/16/07	CMS	MCH
3	8/7/07	MCH	MCH
4	9/24/07	MCH	MCH

WA–2.0



NOTES:

1. ALL METERS SHALL BE INSTALLED BY THE CITY OF BATTLE GROUND.
2. PRIOR TO CITY INSTALLATION OF METERS, ALL SERVICE APPLICATIONS MUST BE COMPLETED AND APPROVED. SERVICE FEES PAID IN FULL AND AS–BUILTS SUBMITTED AND APPROVED.
3. CONTRACTOR SHALL CONTACT CITY ENGINEERING DIVISION AT (360) 342–5071, 48 HOURS PRIOR TO INSTALLING ANY WATER SERVICE CONNECTIONS.
4. METERS WILL NOT BE SET BY THE CITY PRIOR TO DISINFECTION OF THE MAIN AND SERVICE, AND PRIOR TO A SUCCESSFUL BACTERIOLOGICAL TEST.
5. WATER SERVICES SHALL BE PRESSURE TESTED ALONG WITH THE MAIN.
6. DURING THE PRESSURE TEST, THE MAIN SHALL BE OPEN FOR INSPECTION OF ALL CORPORATION STOPS.
7. USE 1–7/8" BIT FOR ALL 2" SADDLE TAPS AND 1–3/8" BIT FOR 1–1/2" SADDLE TAPS.
8. METER BOX IS NOT ALLOWED IN HARD SURFACED AREAS WITHOUT PRIOR WRITTEN APPROVAL. METER BOX SHALL BE SLIGHTLY HIGHER (1/8" MAX.) THAN SURROUNDING GRADE AND MADE TO DRAIN AWAY FROM BOX.
9. BROOKS 65 METER BOX AND EXTENSION MAY BE ALLOWED WITH 1–1/2" METER SETS ONLY.

1–1/2" & 2" WATER SERVICE

PLAN #

THE CITY OF BATTLE GROUND

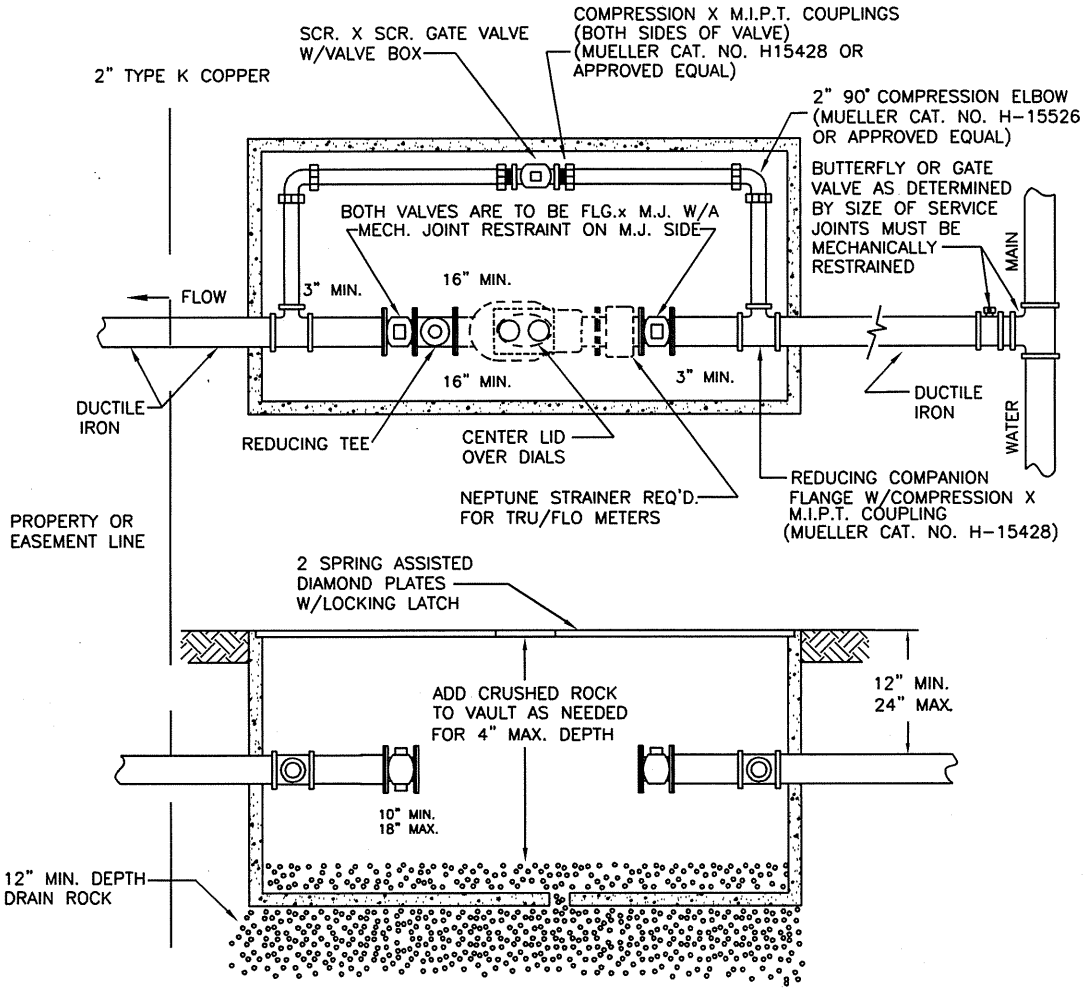
CITY OF BATTLE GROUND
APPROVED

8/22/01

CITY ENGINEER DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	8/12/98	BSG	GGH
2	4/16/07	JMH	MCH
3	8/7/07	MCH	MCH

WA–2.1



VAULT

UTILITY VAULT CO. #575-LA-3660P
#676-WA-3660P W/#3660 GAL. LID

R.C.P. VAULTS #76632 W/#57-TL-B LID

VAULTS SHALL BE SIZED TO ALLOW FOR MIN. CLEARANCE.

IN SUSPECTED HIGH GROUND WATER AREAS, THE DRAIN MAY BE OMITTED IF APPROVED BY THE CITY WATER ENGINEER.

METER SIZE	BY-PASS LINE SIZE	BY-PASS MATERIAL
3"	2" MIN.	GAL.
4"	2" MIN.	GAL.
6"	4"	D.I.
8"	6"	D.I.

NEPTUNE STRAINER:
3" = #53107-000
4" = #53107-100
6" = #52000-201
8" = #52000-302

NOTES:

1. PRIOR TO METER INSTALLATION, GATE VALVES SHALL BE ALIGNED & SPACED W/RIGID SPOOL (DRILLED WITH HOLES SO AS NOT TO ALLOW WATER PASSAGE).
2. CITY TO SUPPLY METER SPACER, REDUCING TEE AND STRAINER. CONTACT CITY INSPECTOR 2 WEEKS PRIOR TO INSTALLATION.
3. TEN PIPE DIAMETERS OF STRAIGHT PIPE REQ'D. IN & OUT OF METER. (IF USING 6" PIPE, NO BENDS ALLOWED WITHIN 5' OF THE METER IN EITHER DIRECTION. FOR EXAMPLE: 6" x 10 = 60").
4. ALL METERS SHALL BE INSTALLED BY THE CITY OF BATTLE GROUND. CONTRACTOR TO INSTALL TEMP. SPACER AS PER NOTE 1.
5. METER BOX IS NOT ALLOWED IN HARD SURFACED AREA WITHOUT PRIOR WRITTEN APPROVAL. METER BOX SHALL BE SLIGHTLY HIGHER THAN SURROUNDING GRADE.

COMPOUND WATER SERVICE

PLAN #

THE CITY OF BATTLE GROUND

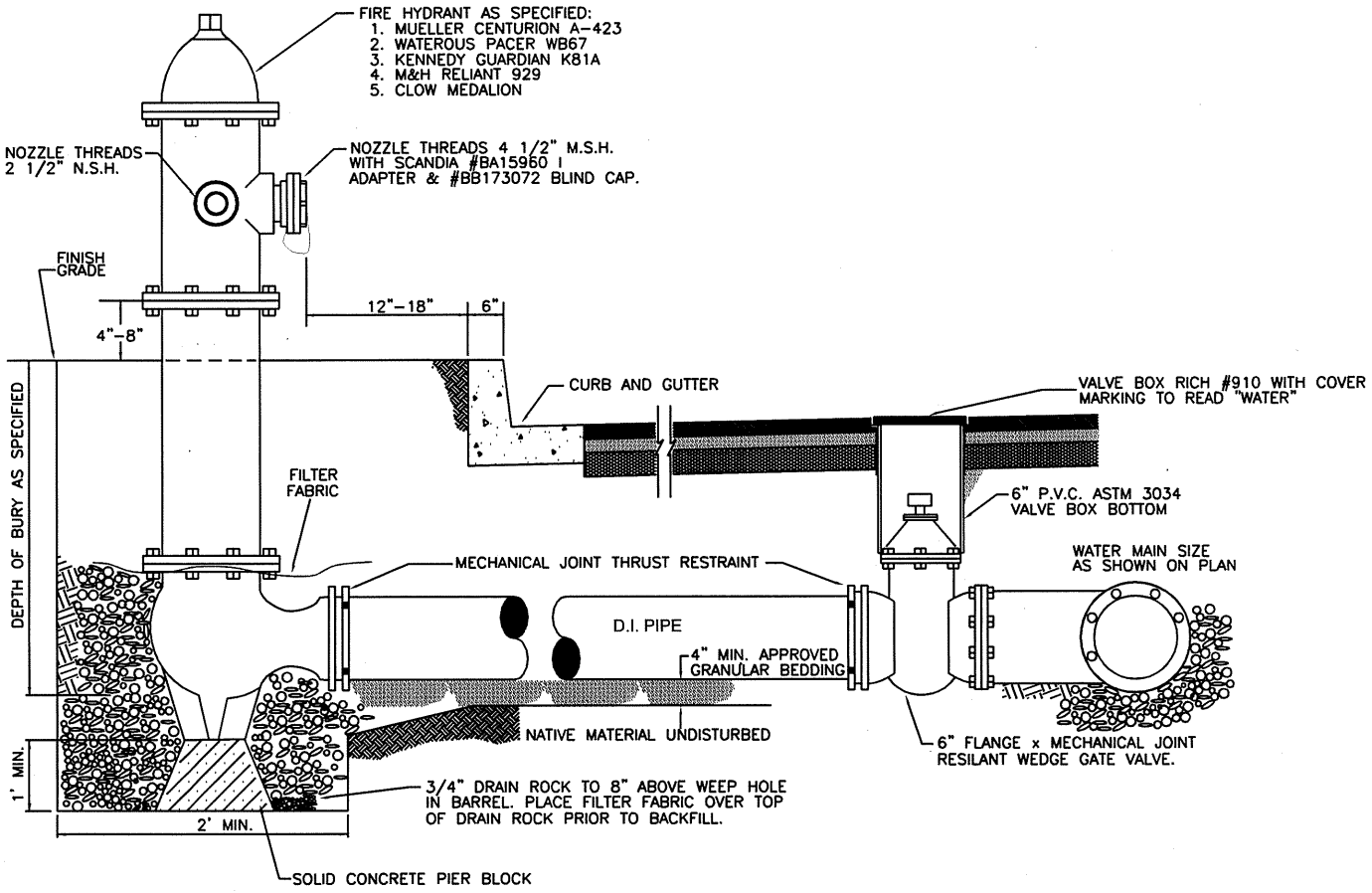
CITY OF BATTLE GROUND
APPROVED

9/24/07

CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	8/12/98	BSG	GGH
2	4/16/07	JMH	MCH
3	9/24/07	MCH	MCH

WA-2.2



CONSTRUCTION NOTES:

1. FIRE HYDRANT INSTALLATIONS SHALL BE APPROVED BY THE CITY INSPECTOR PRIOR TO BACKFILLING.
2. IN GENERAL FIRE HYDRANT LOCATIONS SHALL BE AS SHOWN ON THE PLANS BUT SHALL CONFORM TO THIS DETAIL. FIRE HYDRANTS SHALL NOT BE SET UNTIL LOCATION AND DEPTH ARE APPROVED BY THE CITY.
3. NO DOMESTIC OR FIRE PROTECTION SERVICES SHALL BE TAPPED OFF OF THE FIRE HYDRANT PIPING.
4. A 4'X4'X4" CONCRETE PAD SHALL BE CENTERED AROUND THE FIRE HYDRANT.
5. CONCRETE PAD SHALL BE PLACED FLUSH IN ELEVATION AND ADJOINED W/BACK OF CURB (IF SIDEWALK IS DETACHED) OR BACK OF SIDEWALK (IF SIDEWALK IS ATTACHED). EXPANSION JOINT MATERIAL SHALL BE PLACED BETWEEN THE CONCRETE PAD AND CURB/SIDEWALK AND BETWEEN CONCRETE AND FIRE HYDRANT.
6. CONCRETE PAD SHALL BE FINISHED TO SIDEWALK STANDARDS.
7. ALL JOINTS SHALL BE RESTRAINED UTILIZING MECHANICAL RESTRAINT SYSTEMS. CONCRETE THRUST BLOCKS SHALL NOT BE ALLOWED.
8. FIRE HYDRANTS SHALL BE FACTORY PAINTED WITH SAFETY YELLOW HIGH GLOSS EQUIPMENT ENAMEL (TOUCH UP IF NECESSARY AFTER INSTALLATION).
9. FIRE HYDRANT MAINS SHALL BE 8" MIN., A 6" MAIN CAN BE USED FOR A DEAD-END RUN OF LESS THAN 50' TO A HYDRANT SUBJECT TO ADEQUATE FIRE FLOW.
10. PROVIDE A BLUE TYPE 2 RPM @ CENTERLINE ON HYDRANT SIDE OF STREET.

FIRE HYDRANT ASSEMBLY

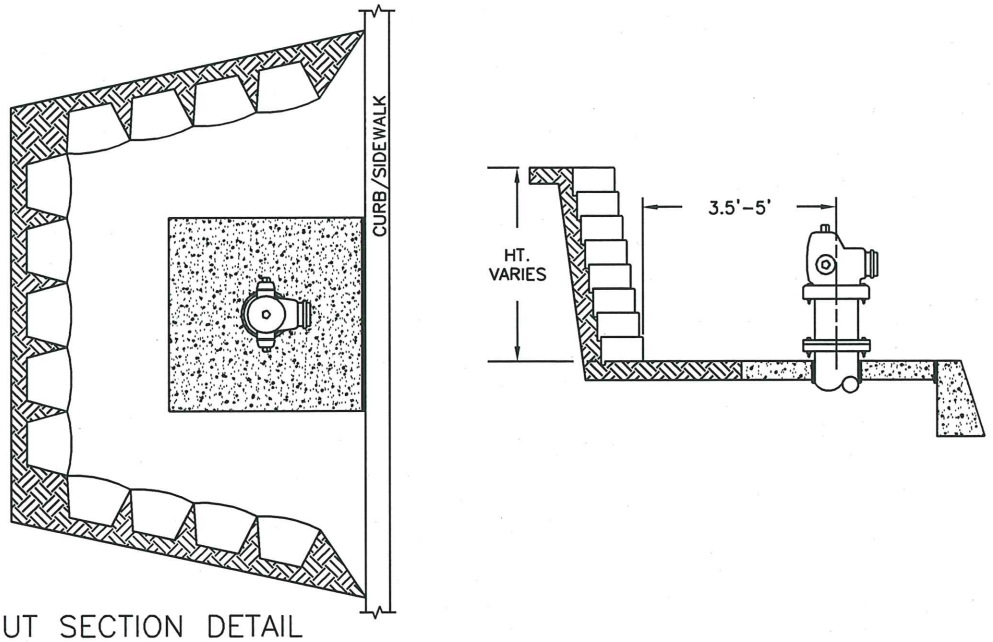
PLAN #

CITY OF BATTLE GROUND
APPROVED

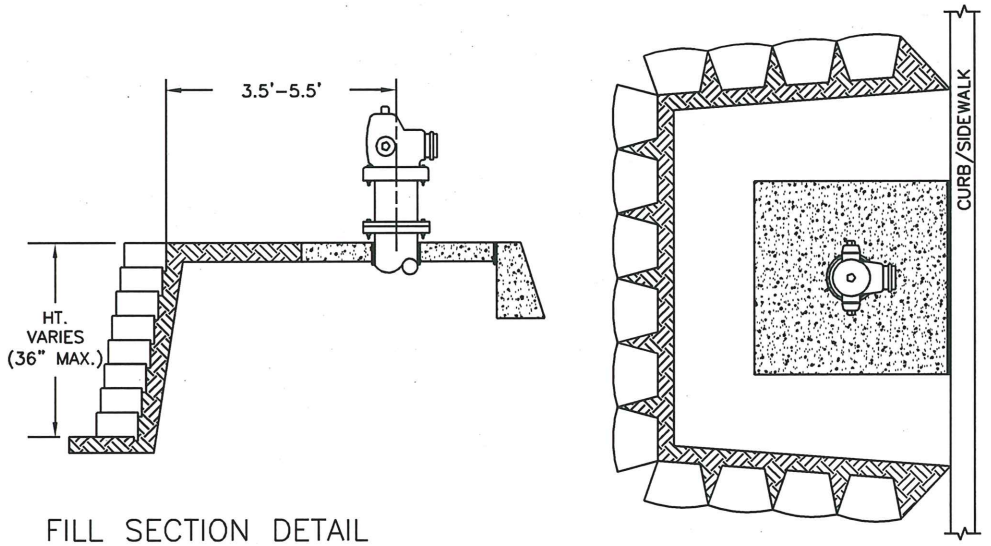
9/24/07
CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH
2	9/24/07	MCH	MCH

WA-2.3



CUT SECTION DETAIL



FILL SECTION DETAIL

NOTES:

1. CONSULT U.B.C. FOR RETAINING WALL CONSTRUCTION REQUIREMENTS.
2. THE AREA WITHIN THE RETAINING WALL BOUNDARIES FROM THE CURB/SIDEWALK TO THE REAR RETAINING WALL SHALL HAVE A MAXIMUM SLOPE OF 1% IN ANY DIRECTION.
3. THE 4'x4' CONCRETE PAD SHALL HAVE A MAXIMUM SLOPE OF 1%.
4. RETAINING WALL SHALL MAINTAIN A MINIMUM RADIUS OF 3.5' AROUND THE HYDRANT

HYDRANT RETAINING WALL

PLAN #

CITY OF BATTLE GROUND
APPROVED

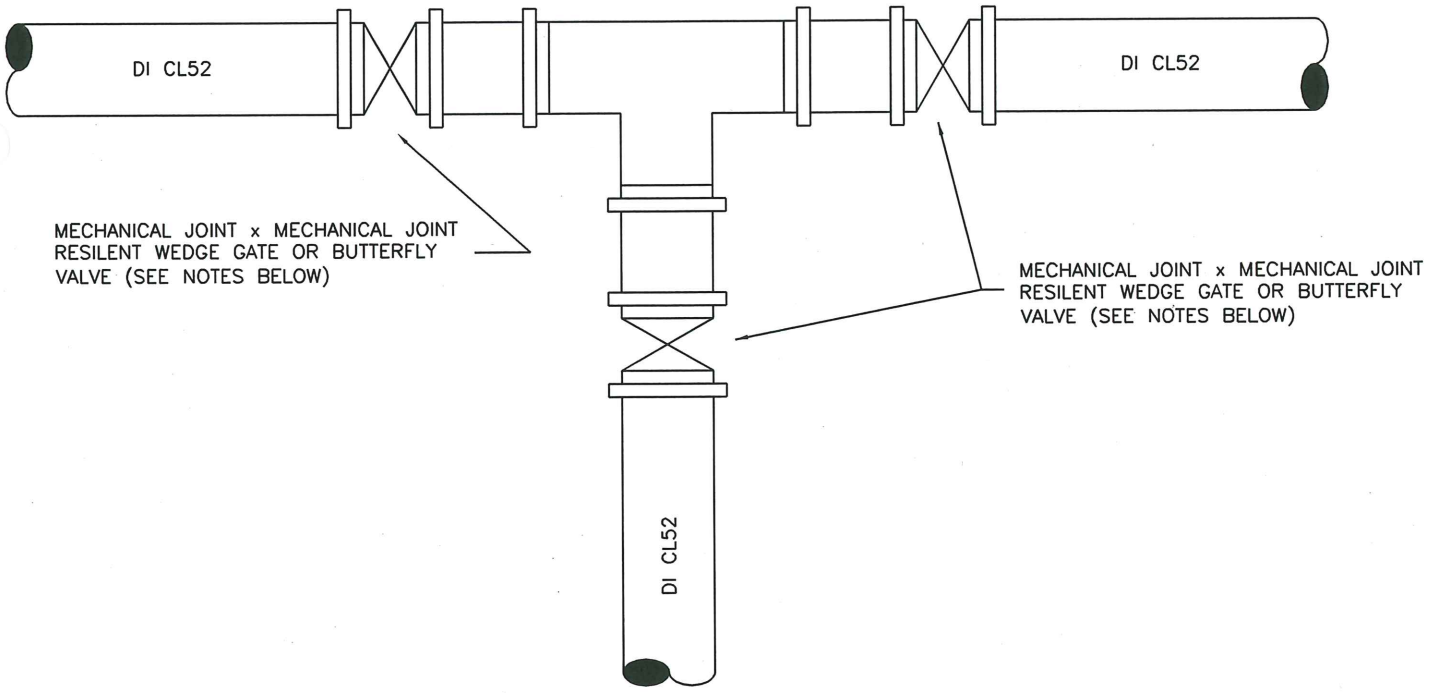
4/16/07

CITY ENGINEER DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH

WA-2.4

N:\CAD Data\Standard Dwgs\Water Details\WA-2.4_Hyd Ret Wall.dwg, 4/10/2007 8:52:40 AM



NOTES:

1. USE DUCTILE IRON PIPE REQUIREMENTS.
2. VALVES TO BE INSTALLED AT ALL BRANCHES. FOR LONG MAIN LINE RUNS INLINE VALVE SPACING NOT TO EXCEED 1000'. LOOP WATER SYSTEM WHERE EVER POSSIBLE. KEEP DEAD ENDS TO A MINIMUM.
3. A NEW VALVE WILL BE INSTALLED AT POINT OF EXTENSION OF SAID LINE, TO PREVENT CROSS CONNECTION AND POSSIBLE CONTAMINATION OF EXISTING LINES.
4. NO DEVIATION ON THE NUMBER OF VALVES UNLESS AUTHORIZED IN WRITING BY THE CITY ENGINEER.
5. MECHANICALLY RESTRAIN ALL JOINTS.
6. RESILIENT-SEATED OR WEDGE GATE VALVES MAY BE USED FOR VALVE INSTALLATIONS OF 8 INCH AND SMALLER.
7. RESILIENT-SEATED OR WEDGE GATE VALVES SHALL BE USED ON ALL FIRE HYDRANT AND FIRE PROTECTION SERVICE.
8. RESILIENT-SEATED OR WEDGE GATE VALVES SHALL CONFORM TO AWWA C509 AND SHALL BE EPOXY COATED ON THE INSIDE.
9. BUTTERFLY VALVES SHALL BE USED FOR ALL VALVE INSTALLATIONS OF 10 INCH AND LARGER.
10. BUTTERFLY VALVES SHALL CONFORM TO AWWA C504 AND SHALL BE CLASS 150-B WITH SHORT BODY.
11. BUTTERFLY VALVES SHALL BE REQUIRED TO HAVE A MINIMUM OF 28 TURNS TO MOVE FROM FULLY OPEN TO FULLY CLOSED POSITION. THE OPERATOR NUT SHALL BE MOUNTED DIRECTLY ON THE VALVE WITH NO EXPOSED OR EXTERNAL COUPLINGS. UNITS SHALL BE FULLY GASKETED AND GREASE PACKED. VALVES SHALL BE INSTALLED WITH THE OPERATOR ON THE SIDE OF THE PIPE NEAREST THE ROAD CENTERLINE.
12. ALL VALVES SHALL BE FURNISHED WITH AN UNDERGROUND MANUAL OPERATOR WITH AN AWWA 2 INCH SQUARE OPERATING NUT AND SHALL OPEN WITH A COUNTER-CLOCKWISE ROTATION. VALVES SHALL BE FURNISHED WITH JOINTS AS CALLED FOR ON THE PLANS.

MAIN LINE AND VALVES

PLAN #

THE CITY OF BATTLE GROUND

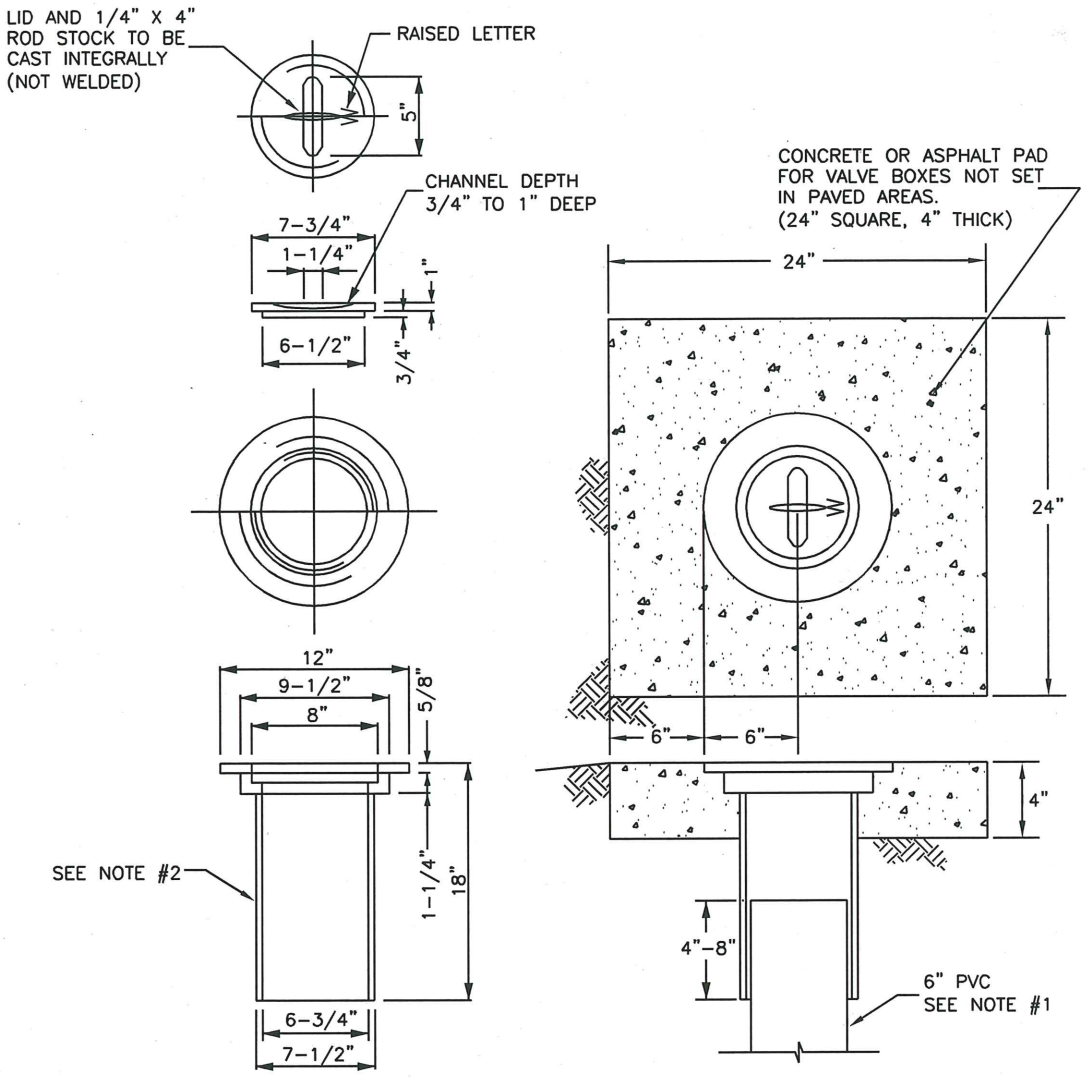
CITY OF BATTLE GROUND
APPROVED

CITY ENGINEER

9/22/07
DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	8/12/98	BSG	GGH
2	8/30/05	ALL	MCH
3	4/16/07	JMH	MCH
4	8/7/07	MCH	MCH

WA-3.0



NOTES:

1. EXTENSIONS SHALL BE 6" ASTM D 3034 SDR 35 PVC PIPE (ONE PIECE)
2. VALVE BOX SHALL BE U.S. FILTER/PACIFIC WATER WORKS NO. 910 OR EQUAL.
3. THERE SHALL BE 1/2" CLEARANCE UNDER THE PIN CAST INTO THE LID.
4. THE OPERATOR NUT SHALL HAVE A DEPTH FROM 18"-30" FROM FINISH GRADE TO THE OPERATOR NUT.

STANDARD VALVE BOX AND COVER

PLAN #

THE CITY OF BATTLE GROUND

CITY OF BATTLE GROUND
APPROVED

9/16/07

CITY ENGINEER DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	8/12/98	BSG	GGH
2	4/16/07	JMH	MCH

WA-3.1

N:\CAD Data\Standard Dwgs\Water Details\WA-3.1_Standard valve box & cvr.dwg, 4/10/2007 8:54:01 AM

Mechanical Restraints

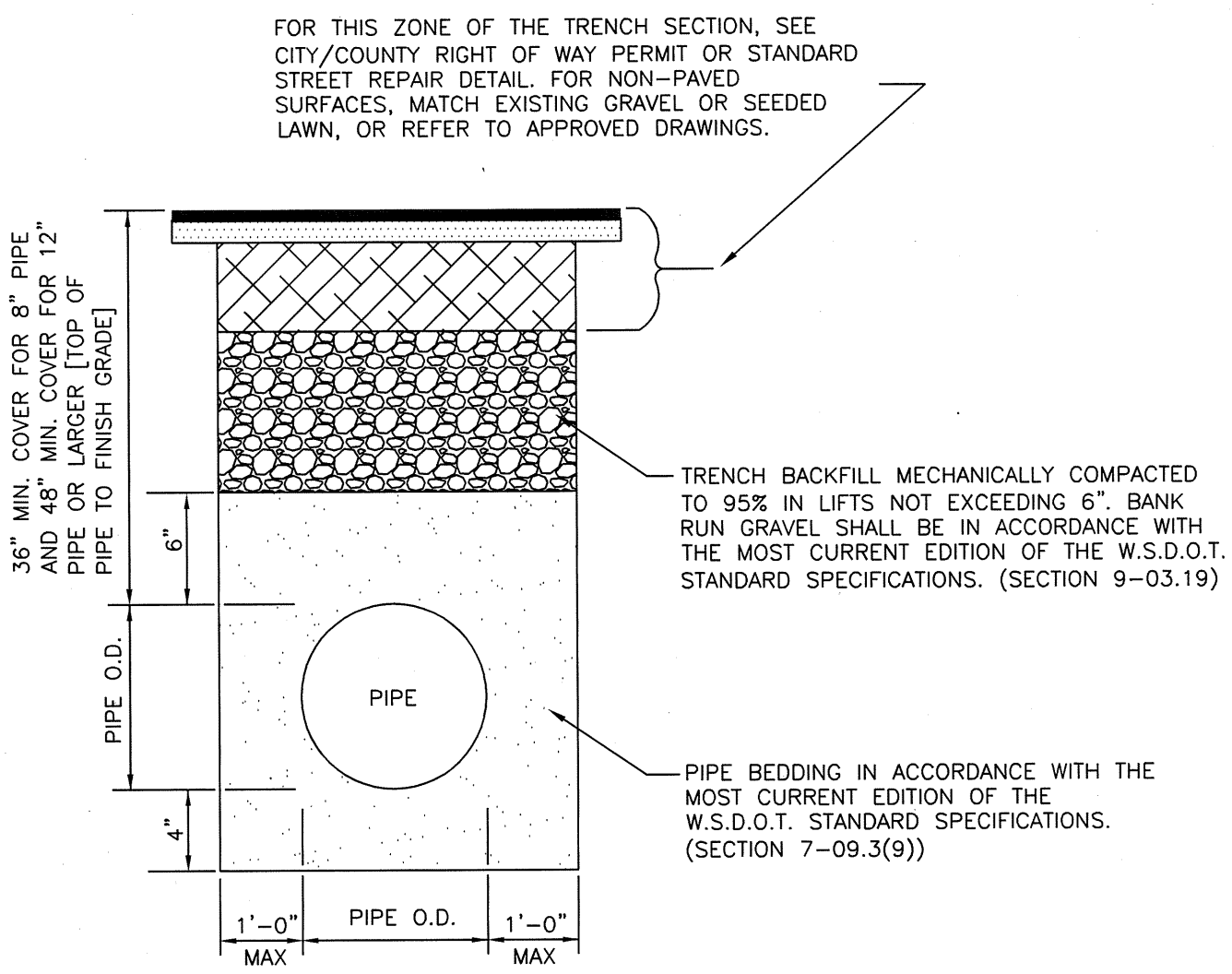
Bends, tees, dead ends, valves, and all reducers shall be supported from separation by mechanical restraints. There must be no unrestrained joints within a sufficient distance from the fitting to provide the necessary earth support and frictional resistance. This distance must be calculated by accepted engineering methods, such as the calculative methods provided by the Ductile Iron Pipe Research Association (DIPRA). The following assumptions need to be made for restraint design for water lines requiring restraints:

1. Assume a Type 5 laying condition per Standard Detail WA-3.3.
2. Provide what soil designation was used in the calculations.
3. Use a design pressure of 200 psi.
4. Use a safety factor of 1.5.
5. Model tees and crosses as 90° bends. Required restrained length shall be used for all three legs of tee or four legs of the cross.
6. Restraint lengths need to be listed on the water plan sheet of the engineering plans.

Note: The above assumptions are based on the DIPRA program.

MECHANICAL RESTRAINTS					PLAN #
THE CITY OF BATTLE GROUND	CITY OF BATTLE GROUND APPROVED CITY ENGINEER 5/9/07 DATE	REVISIONS:	DATE:	DRAWN:	DESIGNED:
		1	4/16/07	JMH	MCH
					WA-3.2

N:\CAD Data\Standard Dwgs\Water Details\WA-3.2_MechanicalRest.dwg, 5/8/2007 14:20 PM



NOTE:

1. OVERSIZE MATERIAL (4"+) SHALL NOT BE ALLOWED IN TRENCH.
2. COMPACTION PERCENTAGES REFER TO RELATIVE DRY DENSITY AS DETERMINED BY STANDARD PROCTOR AASHTO MODIFIED T 180
3. ALL EXISTING PAVED SURFACES SHALL BE SAW CUT A MINIMUM OF 6" OUTSIDE OF EDGE OF TRENCH TO PROVIDE A NEAT STRAIGHT EDGE.
4. THE EDGES OF ALL EXISTING ASPHALT SURFACES SHALL BE CLEANED AND A TACK COAT SHALL BE APPLIED. ALL JOINTS SHALL BE SAND SEALED.
5. ALL BACKFILL SHALL BE MECHANICALLY COMPACTED IN LIFTS WHICH IN NO CASE EXCEED 12" LOOSE.

TYPICAL TRENCH BACKFILL AND BEDDING

PLAN #

THE CITY OF BATTLE GROUND

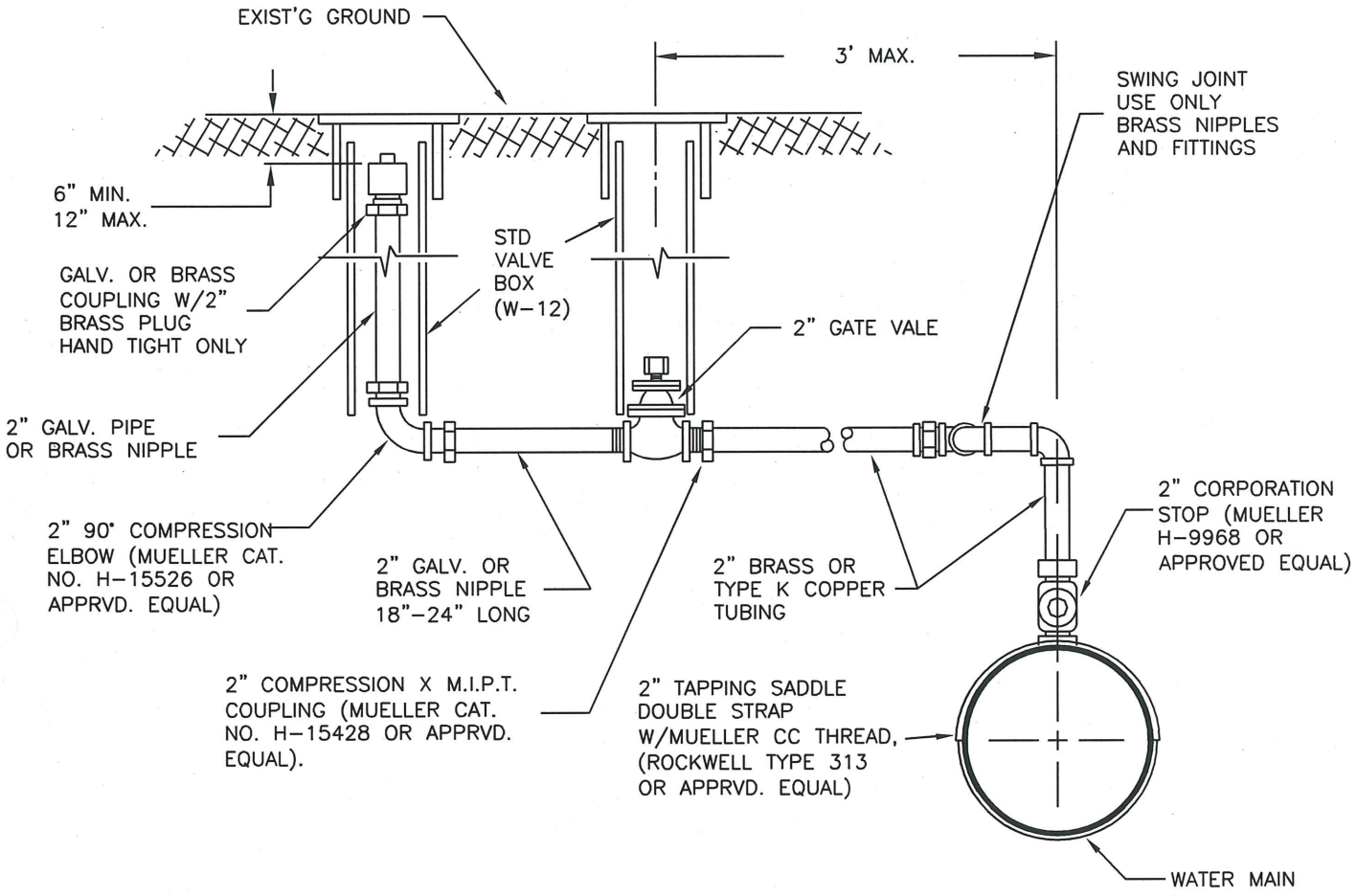
CITY OF BATTLE GROUND
APPROVED

9/24/07

CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH
2	9/24/07	MCH	MCH

WA-3.3



STANDARD MANUAL AIR RELEASE VALVE

PLAN #

CITY OF BATTLE GROUND APPROVED

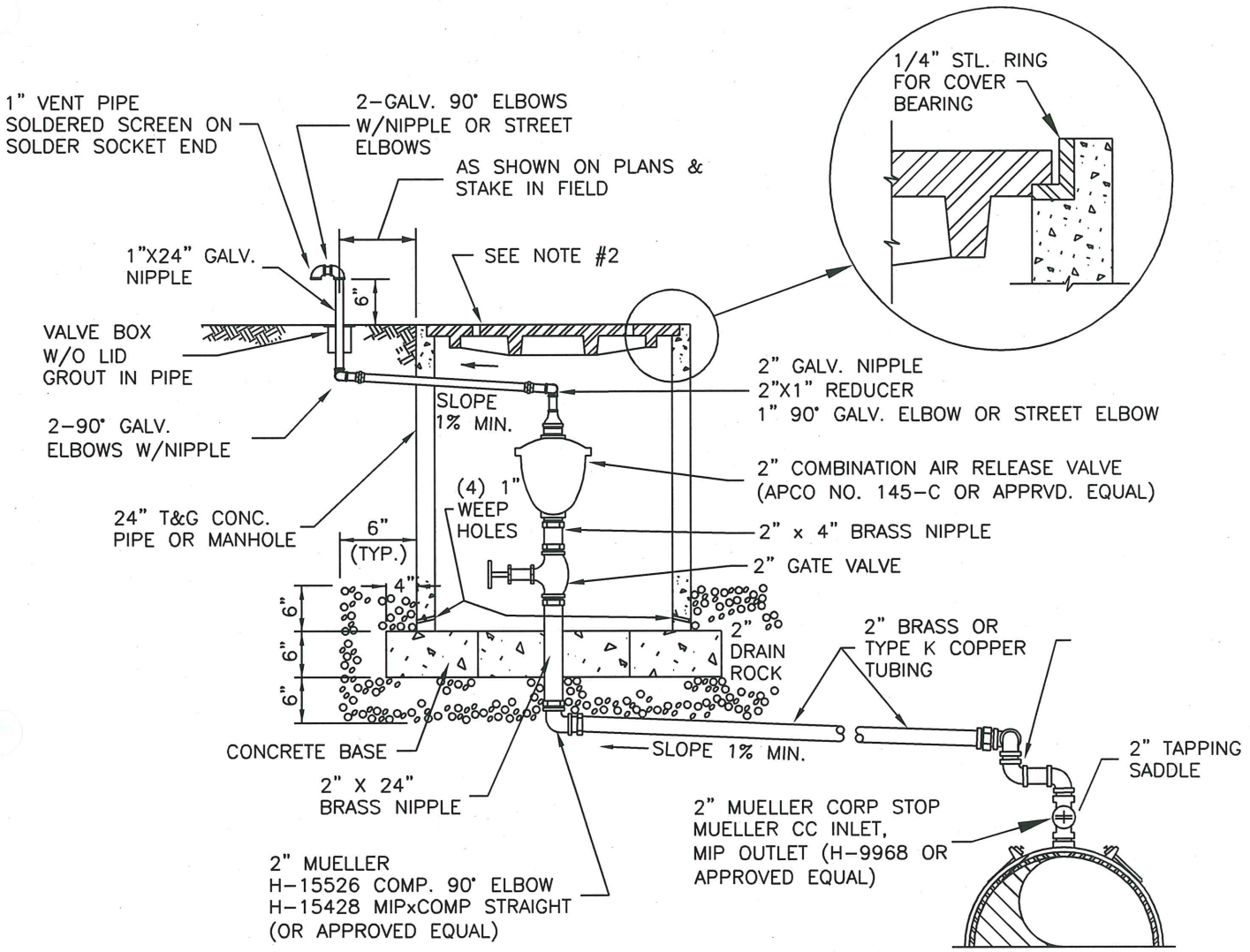
4/16/07

CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH

WA-4.0

N:\CAD Data\Standard Dwgs\Water Details\WA-4.0_Stand Man Air Rel valve.dwg, 4/10/2007 8:55:35 AM



NOTE:

1. PLACE VENT AND AIR RELEASE UNIT ASSEMBLY OUTSIDE OF HARD SURFACED AREA IN R.O.W. OR 15' EASEMENT DEDICATED TO THE CITY OF VANCOUVER
2. MANHOLE COVER SHALL BE SALEM IRON WORKS NO. A2974 OR APPROVED EQUAL W/4 1/2" VENT HOLES ON 17" CIRCLE.

COMBINATION AIR RELEASE VALVE

PLAN #

THE CITY OF BATTLE GROUND

CITY OF BATTLE GROUND
APPROVED

CITY ENGINEER — DATE 4/16/07

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH

WA-4.1

N:\CAD Data\Standard Dwgs\Water Details\WA-4.1_Comb Air Release Valve.dwg, 4/10/2007 8:56:12 AM

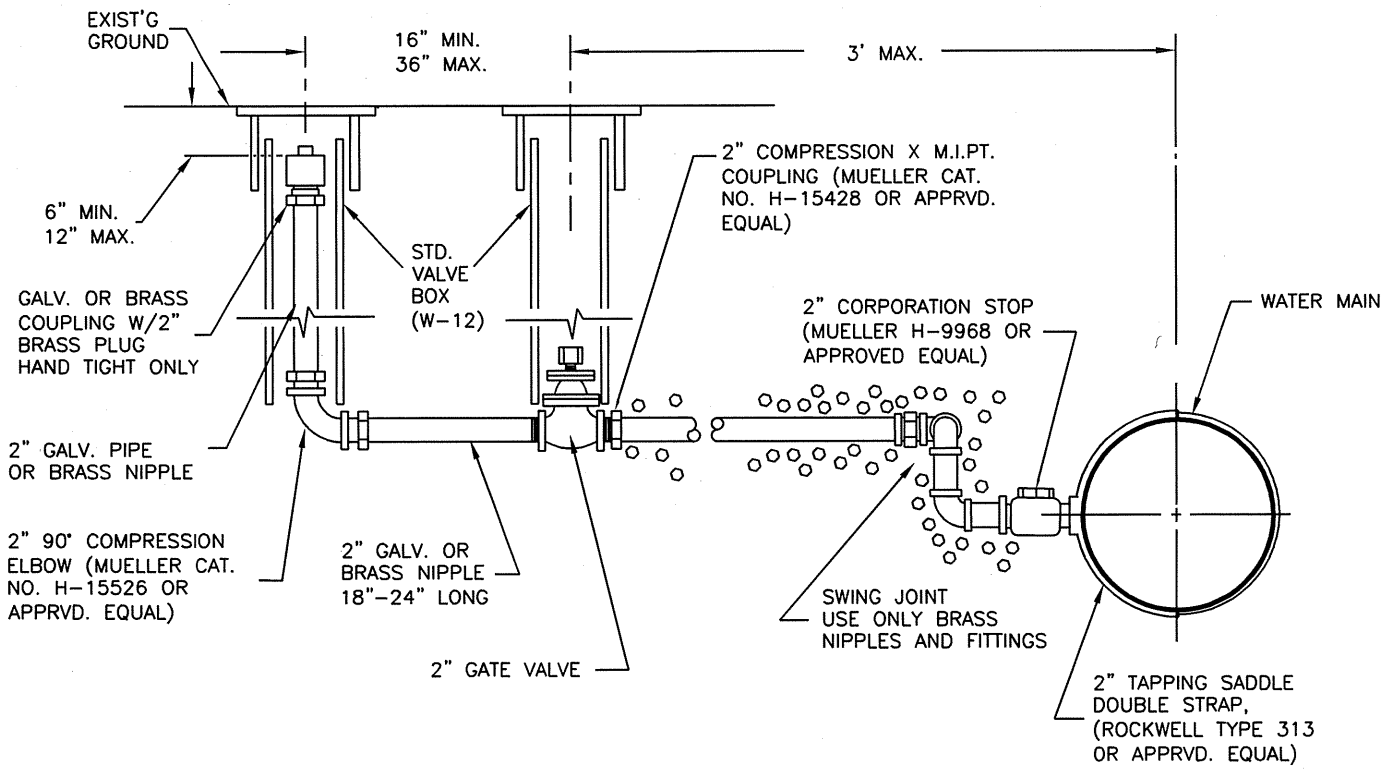


TABLE "A"

MAIN DIAMETER	BLOW-OFF DIAMETER
<12"	2" MINIMUM
≥12"	4" MINIMUM

NOTES:

1. BLOWOFFS SHALL BE INSTALLED 1' FROM THE END OF THE MAIN.
2. (5/8-) GRAVEL SHALL BE USED AS BEDDING AROUND THE SERVICE.
3. ALL PIPING UPSTREAM OF THE 2" GATE VALVE SHALL BE TYPE K COPPER OR BRASS

STANDARD BLOWOFF ASSEMBLY

PLAN #

THE CITY OF BATTLE GROUND

CITY OF BATTLE GROUND
APPROVED

9/24/07

CITY ENGINEER DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH
2	9/24/07	MCH	MCH

WA-4.2

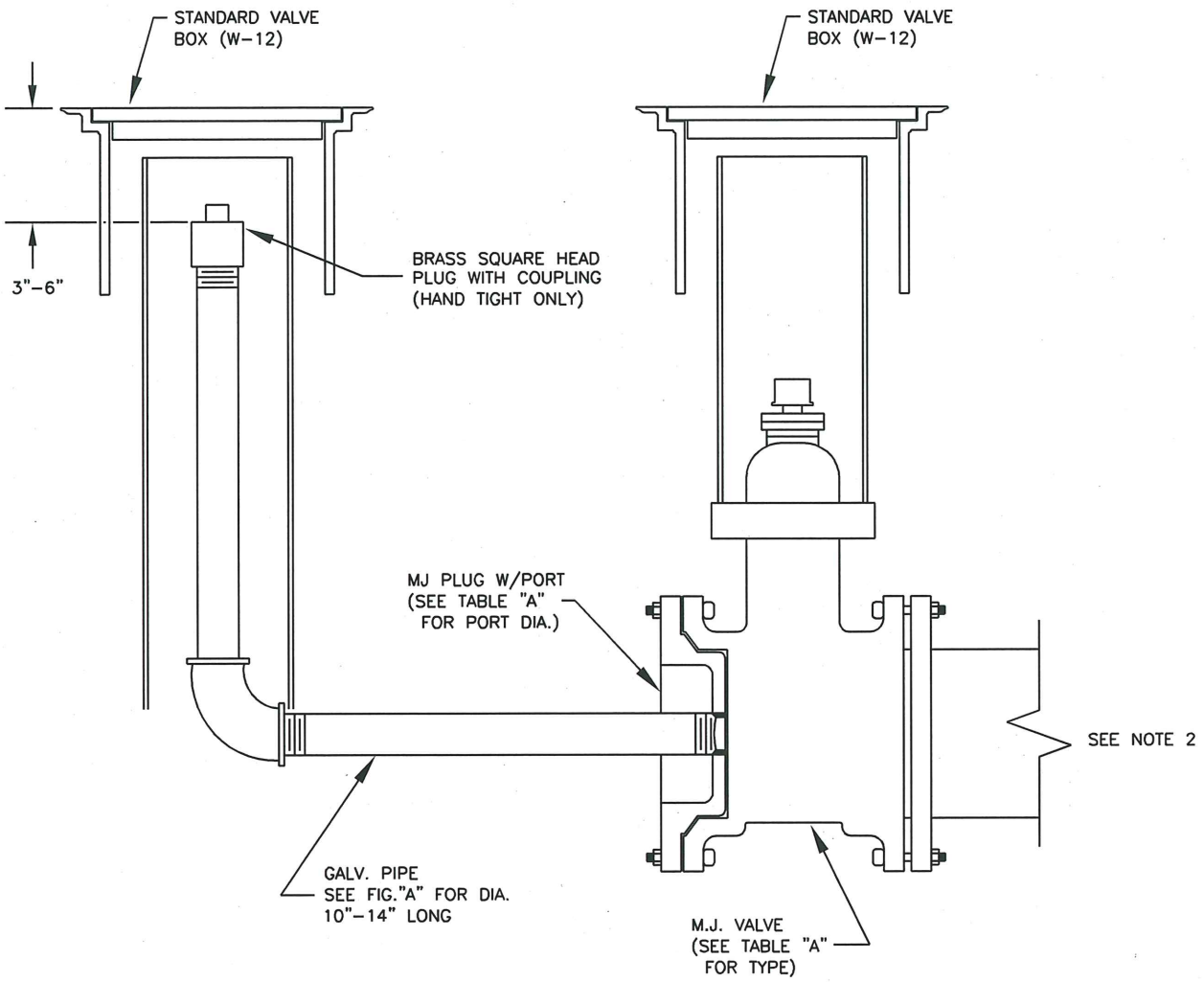


TABLE "A"

MAIN DIAMETER	VALVE TYPE	BLOW-OFF DIAMETER
<10"	GATE	2" MINIMUM
≥10"	BUTTERFLY	4" MINIMUM

TABLE "B"

MAIN DIAMETER	4"	6"	8"	10"	12"	14"	16"	18"
RESTRAINT LENGTH	54'	76'	98'	119'	108'	123'	138'	153'

NOTES:

1. SIZE OF BLOWOFF DETERMINED BY SIZE AND LENGTH OF MAIN
2. ALL JOINTS SHALL BE RESTRAINED UPSTREAM OF VALVE. SEE TABLE 'B' FOR MINIMUM RESTRAINT DISTANCES.
3. RESTRAINT LENGTHS FOR MAINS LARGER THAN 18" SHALL BE NOTED ON THE CIVIL PLANS PRIOR TO CIVIL PLAN APPROVAL.

TEMP. CONSTRUCTION BLOWOFF ASSEMBLY

PLAN #

CITY OF BATTLE GROUND APPROVED

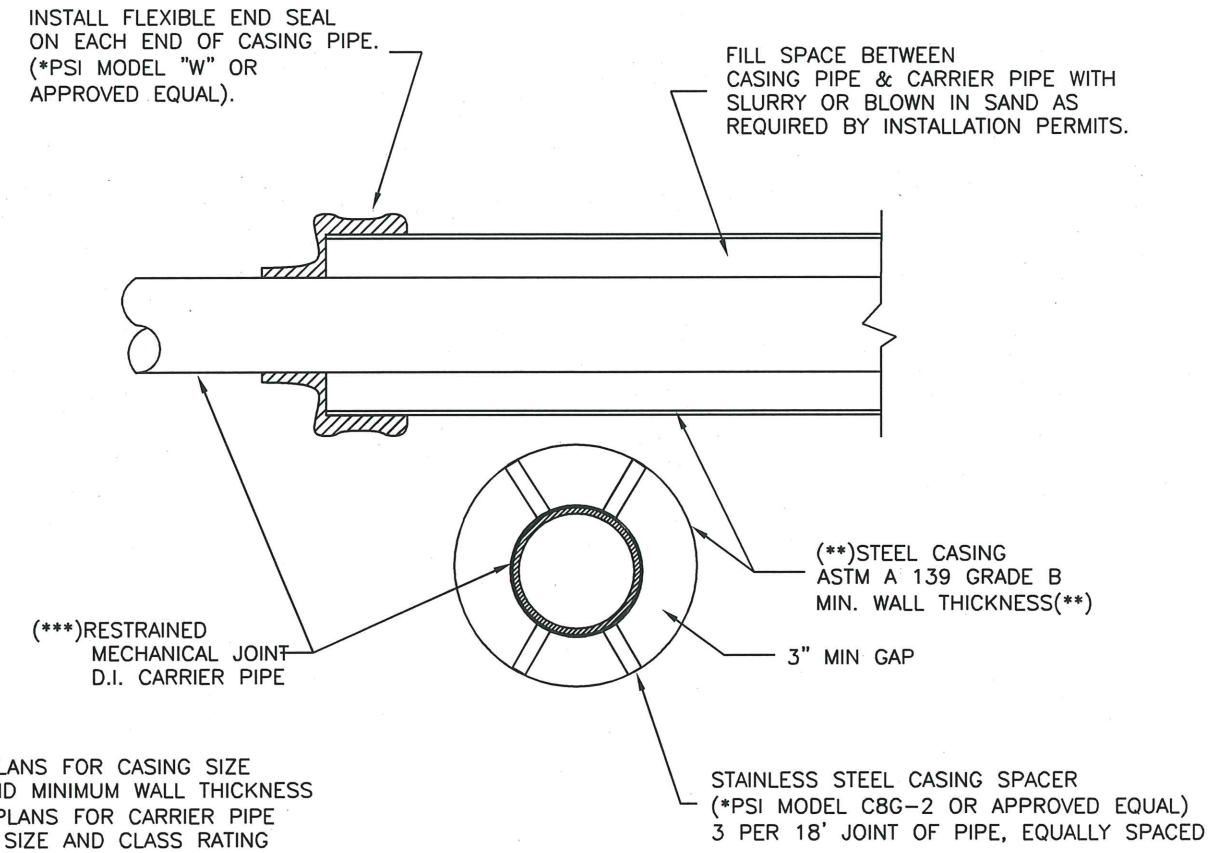
CITY ENGINEER

4/16/07
DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH

WA-4.3

N:\CAD Data\Standard Dwgs\Water Details\WA-4.3_Temp Const BO Assembly.dwg, 4/10/2007 8:57:42 AM



(**)SEE PLANS FOR CASING SIZE AND MINIMUM WALL THICKNESS
(***)SEE PLANS FOR CARRIER PIPE SIZE AND CLASS RATING
*Pipeline Seal and Insulator, Inc.

1. PUBLIC AND PRIVATE MAINS SHALL BE PLACED IN SEPARATE CASINGS.
2. FOR CASINGS UNDER RAILROAD TRACKS, WRITTEN PERMISSION FROM THE OWNER OF THE RAILROAD TRACKS IS REQUIRED PRIOR TO OBTAINING CITY OF BATTLE GROUND PERMITS TO PROCEED.
3. NO PRIVATE UTILITIES SHALL BE ALLOWED IN CITY OF BATTLE GROUND CASINGS.

PIPE AND CASING

PLAN #

CITY OF BATTLE GROUND
APPROVED

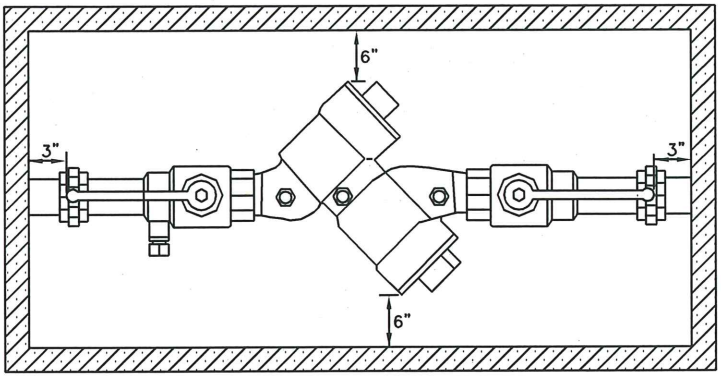
4/16/07

CITY ENGINEER — DATE

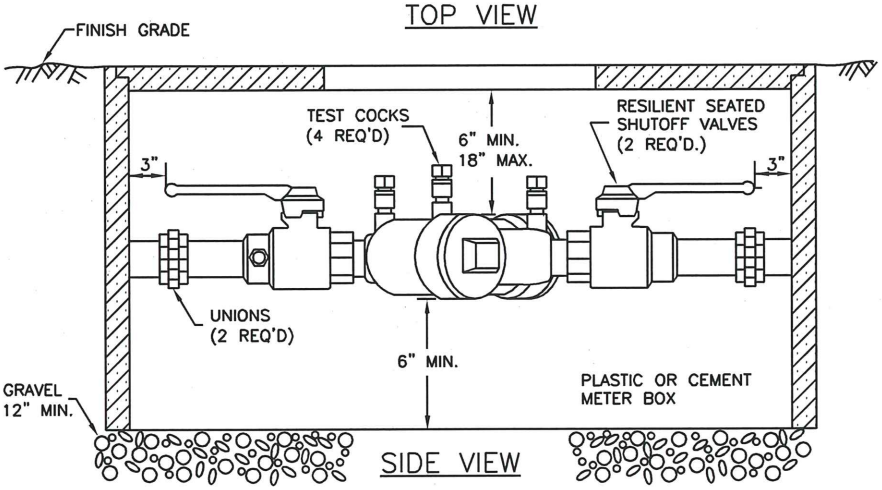
REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH

WA-4.4

N:\CAD Data\Standard Dwgs\Water Details\WA-4.4_Pipe & Casing dtl.dwg, 4/10/2007 8:58:50 AM



TOP VIEW



SIDE VIEW

NOTES:

1. APPROVED DOUBLE CHECK VALVE ASSEMBLY (DCVA) TO LAY HORIZONTAL WITH GROUND. (VERTICAL ALLOWED IF APPROVED BY WA. DEPT. OF HEALTH)
2. DCVA MAY BE INSTALLED ABOVE OR BELOW GROUND PROVIDED ALL CLEARANCES ARE MET.
3. DESIGN FOR BACK SIPHONAGE AND BACK PRESSURE.
4. TEST COCKS TO EITHER FACE OUTWARDS OR UPWARDS FROM ASSEMBLY.
5. THOROUGHLY FLUSH LINES PRIOR TO INSTALLATION OF BACKFLOW PREVENTER.
6. DO NOT INSTALL IN AN AREA SUBJECT TO FLOODING.
7. DCVA MUST BE ACCESSIBLE.
8. PROTECT DCVA FROM FREEZING.
9. DCVA SHALL BE APPROVED BY THE STATE OF WASHINGTON
10. A PLUMBING PERMIT IS REQUIRED–CONTACT THE APPROPRIATE JURISDICTION'S PERMITS COUNTER
11. DCVA MUST BE TESTED AFTER INSTALLATION, THEN ANNUALLY BY A WA. STATE CERTIFIED BACKFLOW TESTER. RESULTS SHALL BE SENT TO THE CITY WATER QUALITY SERVICES.

STANDARD DOUBLE CHECK VALVE ASSEMBLY 2" AND SMALLER

PLAN #

THE CITY OF BATTLE GROUND

CITY OF BATTLE GROUND
APPROVED

4/16/07

CITY ENGINEER DATE

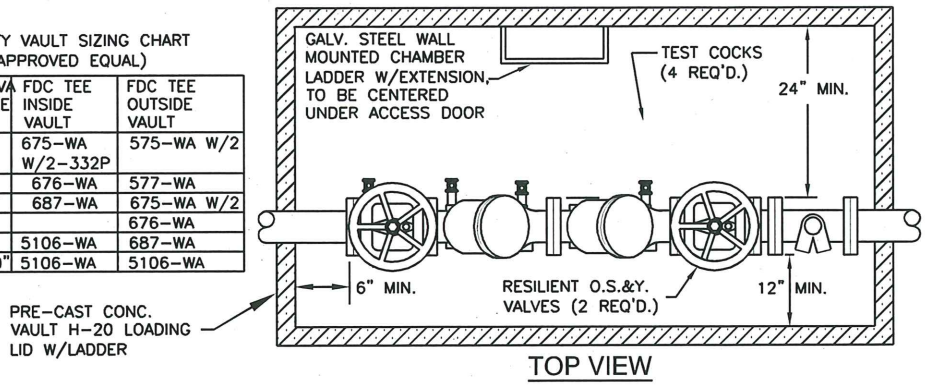
REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH

WA–5.0

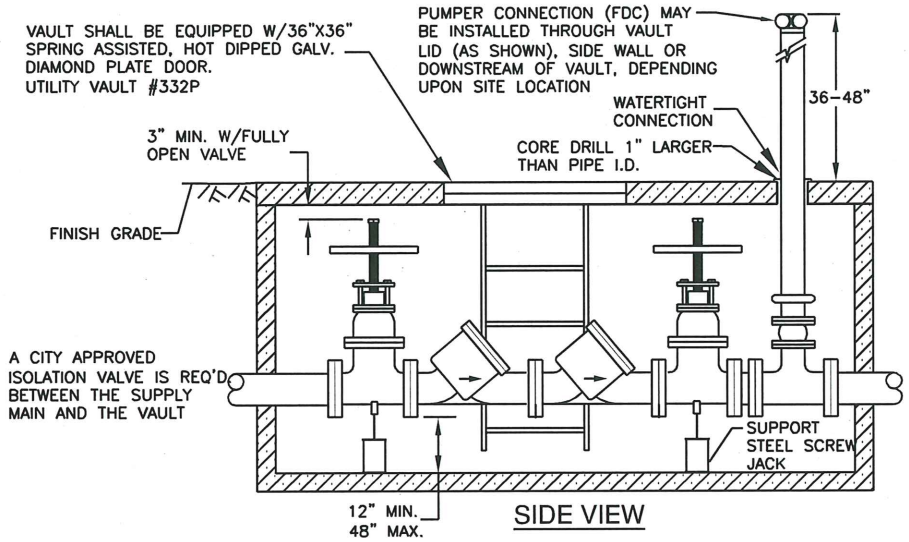
N:\CAD Data\Standard Dwgs\Water Details\WA-5.0_DCVA 2 in sm.DWG, 4/10/2007 8:59:33 AM

UTILITY VAULT SIZING CHART
(OR APPROVED EQUAL)

PIPE DEPTH UP TO	DCVA SIZE	FDC TEE INSIDE VAULT	FDC TEE OUTSIDE VAULT
4'	4"	675-WA W/2-332P	575-WA W/2
6'	4"	676-WA	577-WA
4'	6"	687-WA	675-WA W/2
6'	6"		676-WA
6'	8"	5106-WA	687-WA
6'	10"	5106-WA	5106-WA



TOP VIEW



SIDE VIEW

NOTES:

1. DCVA MUST BE ON DEPT. OF HEALTH APPROVED LIST.
2. THE DCVA MAY BE INSTALLED ABOVE OR BELOW GROUND PROVIDED ALL CLEARANCES ARE MET.
3. APPROVED DCVA TO LAY HORIZONTAL WITH THE GROUND. (VERTICAL IF APPROVED BY DEPT. OF HEALTH)
4. THE WATER LINE SHALL BE DISINFECTED, FLUSHED AND PRESSURE TESTED PRIOR TO INSTALLING THE BACKFLOW ASSEMBLY. THE DCVA SHALL BE PROTECTED FROM FREEZING AND FLOODING.
5. ALL PIPE, VALVE AND FITTING JOINTS, FROM SUPPLY MAIN, SHALL BE FLANGED OR RESTRAINED.
6. GROUT PIPE ENTRANCE AND EXIT, IN VAULT, WITH WATERTIGHT GROUT.
7. ALL VAULTS SHALL BE PRE-APPROVED BY THE FIRE MARSHALL PRIOR TO INSTALLATION.
8. DCVA SHALL BE INSTALLED AT THE PROPERTY LINE OR EASEMENT LINE, THE BUILDINGS FALL HEIGHT AWAY FROM THE BUILDING AND ON OWNER'S PROPERTY.
9. DCVA SHALL HAVE A MINIMUM OF 3' CLEARANCE FROM ALL STRUCTURES.
10. DCVA SHALL BE TESTED AFTER INSTALLATION AND PRIOR TO ACCEPTANCE AND ALSO YEARLY THEREAFTER BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER. TEST RESULTS SHALL BE SENT TO THE CITY OF BATTLE GROUND OPERATIONS CENTER.
11. PROVIDE 2" DRAIN TO DAY LIGHT OR SUMP PUMP TO STORM POND.
12. INSTALL BALL DRIP VALVE (NFPA 13).
13. CITY OF BATTLE GROUND PLUMBING PERMIT IS REQUIRED FOR INSTALLATION FOR DCVA.
14. DCVA MUST BE APPROVED BY THE CITY OF BATTLE GROUND OPERATIONS CENTER @ 360-342-5350.

STANDARD DOUBLE CHECK VALVE ASSEMBLY 2½" & LARGER

PLAN #

THE CITY OF BATTLE GROUND

CITY OF BATTLE GROUND
APPROVED

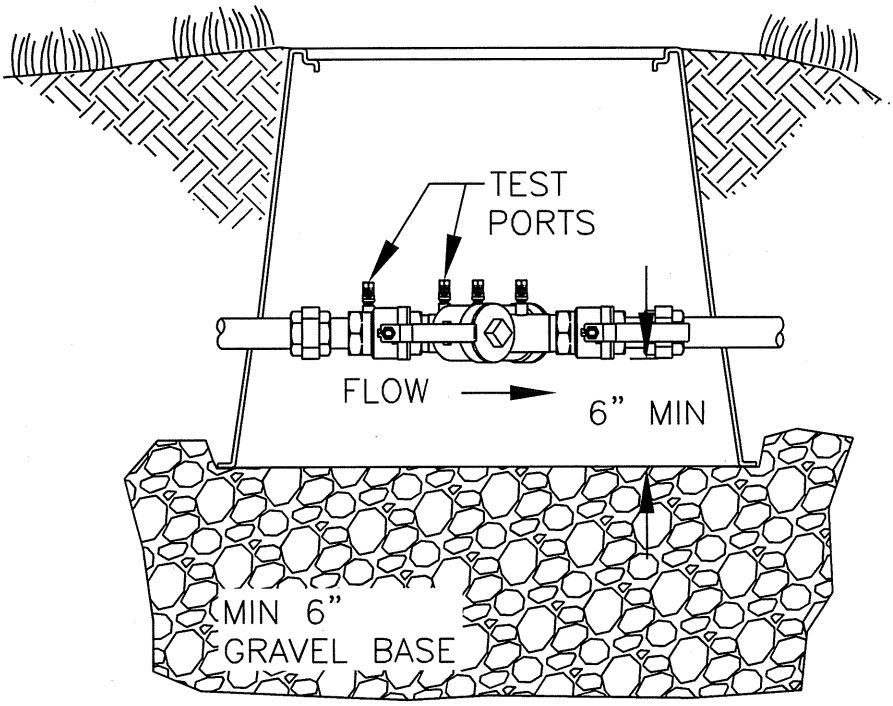
4/16/07

CITY ENGINEER DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	8/12/98	BSG	GGH
2	4/16/07	JMH	MCH

WA-5.1

N:\CAD Data\Standard Dwgs\Water Details\WA-5.1_ DCVA 2.5 larger.dwg, 4/10/2007 9:00:09 AM



ELEVATION

NOTES:

1. APPROVED DOUBLE CHECK VALVE ASSEMBLY (DCVA) TO LAY HORIZONTAL WITH GROUND. (VERTICAL ALLOWED IF APPROVED BY WA. DEPT. OF HEALTH)
2. DCVA MAY BE INSTALLED ABOVE OR BELOW GROUND PROVIDED ALL CLEARANCES ARE MET.
3. DESIGN FOR BACK SIPHONAGE AND BACK PRESSURE.
4. TEST COCKS TO EITHER FACE OUTWARDS OR UPWARDS FROM ASSEMBLY.
5. THOROUGHLY FLUSH LINES PRIOR TO INSTALLATION OF BACKFLOW PREVENTER.
6. DO NOT INSTALL IN AN AREA SUBJECT TO FLOODING.
7. DCVA MUST BE ACCESSIBLE.
8. PROTECT DCVA FROM FREEZING.
9. DCVA SHALL BE APPROVED BY THE STATE OF WASHINGTON
10. A PLUMBING PERMIT IS REQUIRED–CONTACT THE APPROPRIATE JURISDICTION'S PERMITS COUNTER
11. DCVA MUST BE TESTED AFTER INSTALLATION, THEN ANNUALLY BY A WA. STATE CERTIFIED BACKFLOW TESTER. RESULTS SHALL BE SENT TO THE CITY OF BATTLE GROUND OPERATIONS CENTER.

DCVA INSTALLATION

PLAN #

THE CITY OF BATTLE GROUND

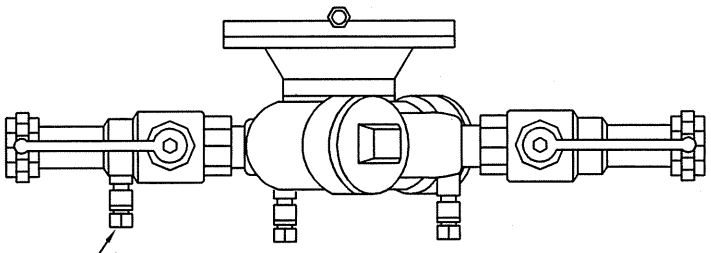
CITY OF BATTLE GROUND
APPROVED

9/24/07

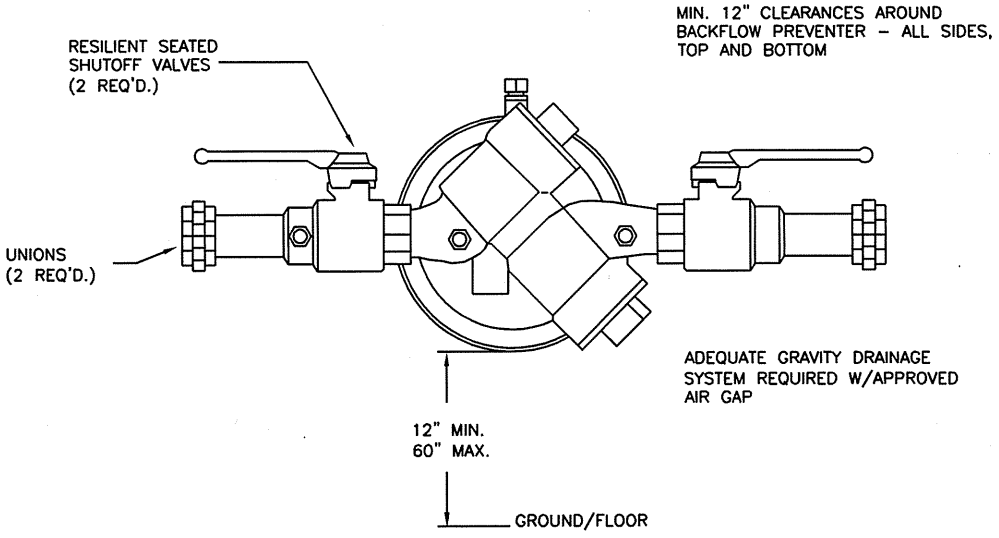
CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	CMS	MCH
2	9/24/07	MCH	MCH

WA–5.2



TOP VIEW



SIDE VIEW

NOTES:

1. APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) TO LAY HORIZONTAL WITH GROUND. (VERTICAL ALLOWED IF APPROVED BY WA. DEPT. OF HEALTH)
2. DESIGN RPBA FOR BACK SIPHONAGE AND BACK PRESSURE.
3. THOROUGHLY FLUSH LINES PRIOR TO INSTALLATION OF BACKFLOW PREVENTER.
4. DO NOT INSTALL IN AN AREA SUBJECT TO FLOODING.
5. RPBA MUST BE ACCESSIBLE.
6. PROTECT RPBA FROM FREEZING.
7. A PLUMBING PERMIT IS REQUIRED–CONTACT THE APPROPRIATE JURISDICTION'S PERMITS COUNTER
8. RPBA MUST BE TESTED AFTER INSTALLATION, THEN ANNUALLY BY A WA. STATE CERTIFIED BACKFLOW TESTER. RESULTS SHALL BE SENT TO THE CITY WATER QUALITY SERVICES.
9. RPBA SHALL BE APPROVED BY THE STATE OF WASHINGTON.
10. RPBA FOR ABOVE GROUND INSTALLATION ONLY.

STANDARD REDUCED PRESSURE BACKFLOW ASSEMBLY 2" & SMALLER

PLAN #

THE CITY OF BATTLE GROUND

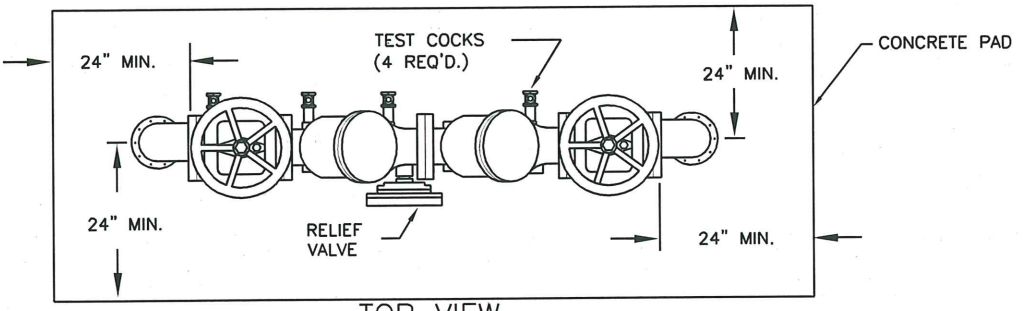
CITY OF BATTLE GROUND
APPROVED

9/24/07

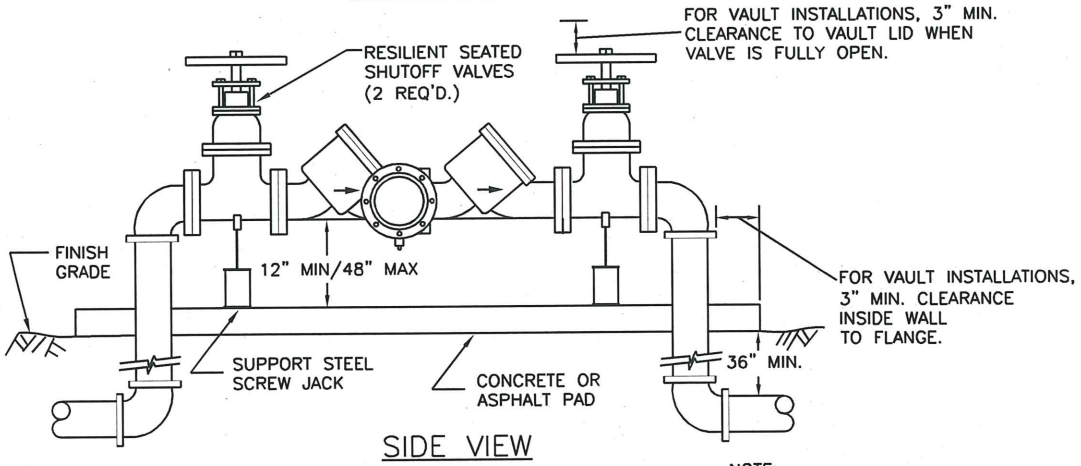
CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH
2	9/24/07	MCH	MCH

WA–5.3



TOP VIEW



SIDE VIEW

NOTE:
A CITY APPROVED VALVE IS REQ'D.
BETWEEN THE SUPPLY MAIN AND
THE R.P.B.A.

NOTE:
PROVIDE HEAT
AND/OR INSULATION

NOTES:

1. APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) TO LAY HORIZONTAL ONLY. (VERTICAL IF APPROVED BY DEPT. OF HEALTH)
2. DESIGNED FOR BACK SIPHONAGE AND BACK PRESSURE.
3. THE WATER LINE SHALL BE DISINFECTED, FLUSHED AND PRESSURE TESTED PRIOR TO INSTALLING THE RPBA. THE RPBA SHALL BE PROTECTED FROM FREEZING AND FLOODING.
4. ALL PIPE, VALVES AND FITTING JOINTS FROM SUPPLY MAIN, SHALL BE FLANGED AND RESTRAINED.
5. GROUT PIPE ENTRANCE AND EXIT IN VAULT, WITH WATERTIGHT GROUT.
6. ALL ENCLOSURES SHALL BE PRE-APPROVED PRIOR TO INSTALLATION.
7. RPBA SHALL BE INSTALLED AT PROPERTY LINE OR EASEMENT LINE AND ON OWNER'S PROPERTY.
8. ADEQUATE GRAVITY DRAINAGE SYSTEM REQUIRED WITH APPROVED AIR GAP.
9. MINIMUM 24" CLEARANCE ON ALL SIDES AROUND RPBA.
10. THE RPBA SHALL BE TESTED AFTER INSTALLATION AND PRIOR TO ACCEPTANCE, ALSO YEARLY THEREAFTER BY A CERTIFIED BACKFLOW ASSEMBLY TESTER. TEST RESULTS SHALL BE SENT TO THE CITY OF BATTLE GROUND PUBLIC WORKS DEPARTMENT.
11. HEAT AND/OR INSULATION SHALL BE PROVIDED TO PREVENT FREEZING

(ABOVE GROUND INSTALLATIONS ONLY)

STANDARD REDUCED PRESSURE BACKFLOW ASSEMBLY 2 1/2" & LARGER

PLAN #

THE CITY OF BATTLE GROUND

CITY OF BATTLE GROUND
APPROVED

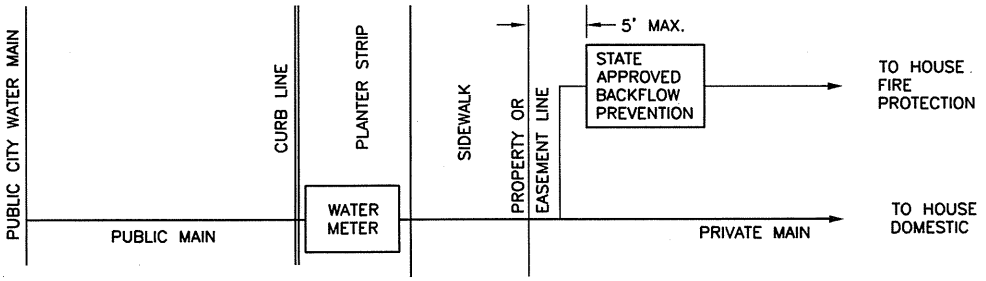
4/16/07

CITY ENGINEER DATE

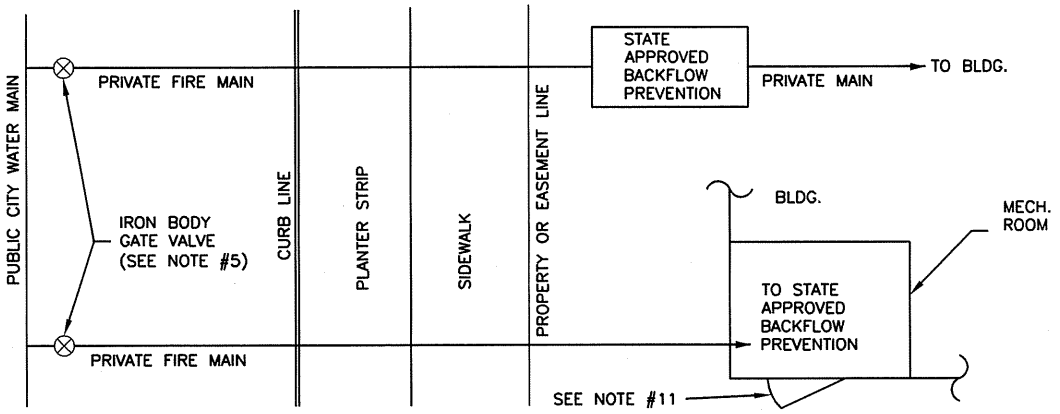
REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH

WA-5.4

N:\CAD Data\Standard Dwgs\Water Details\WA-5.4_Standard RPBA 2.5in larger.dwg 4/10/2007 9:18:40 AM



SINGLE-FAMILY FIRE PROTECTION INSTALLATION



NON SINGLE-FAMILY BACKFLOW PREVENTION INSTALLATION

NOTES:

1. ALL FIRE PROTECTION SERVICES SHALL HAVE AN IRON BODY GATE VALVE AS DESCRIBED IN 1-2.06 IN THE CITY OF BATTLE GROUND ENGINEERING DEPARTMENT'S WATER DESIGN AND CONSTRUCTION REQUIREMENTS. VALVES SHALL BE LOCATED AT THE CONNECTION TO THE WATER MAIN. WATER METERS ARE NOT REQUIRED ON FIRE PROTECTION.
2. ALL BACKFLOW DEVICES SHALL BE LOCATED PER APPROVED PLANS.
3. BACKFLOW DEVICES, LOCATED OUTSIDE OF A BUILDING, SHALL BE PLACED IN A STANDARD PLASTIC METER BOX, PLASTIC IRRIGATION BOX, OR CONCRETE VAULT WITH LID PER WA-5.0, WA-5.1, WA-5.2, AND WA-5.3, AS APPROPRIATE.
4. COMMERCIAL BACKFLOW DEVICES MAY BE INSTALLED INSIDE THE BUILDING IN A MECHANICAL ROOM, AS ALLOWED BY THE I.B.C. AND U.P.C. AS AMENDED BY THE STATE OF WASHINGTON, PROVIDED THE ROOM REMAINS ACCESSIBLE TO INSPECTORS.
5. ALL COMMERCIAL FIRE PROTECTION SERVICES SHALL BE PRIVATELY OWNED AND MAINTAINED DOWNSTREAM OF THE GATE VALVE LOCATED AT THE PUBLIC MAIN.
6. ALL BACKFLOW DEVICES ARE PRIVATELY OWNED, MAINTAINED, AND MUST BE TESTED ANNUALLY BY A CERTIFIED BACKFLOW ASSEMBLY TESTER.
7. SINGLE FAMILY WATER METERS SHALL BE SIZED TO MEET THE REQUIRED FIRE FLOW.
8. ALL FIRE PROTECTION SERVICES, EXCEPT SINGLE FAMILY APPLICATIONS, SHALL BE TAPPED SEPARATELY FROM DOMESTIC SERVICES AND FIRE HYDRANT LEADS.
9. A FIRE HYDRANT IS REQUIRED WITHIN A 100 FEET OF THE FIRE DEPARTMENT CONNECTION (FDC).
10. THE FDC MUST BE REMOTE FROM THE BUILDING A MINIMUM DISTANCE EQUAL TO ONE-AND-A-HALF TIMES THE HEIGHT OF THE BUILDING.
11. A DOOR ON THE EXTERIOR OF THE BUILDING MAY BE REQUIRED WITHIN 5 FEET OF THE SPRINKLER RISER PURSUANT TO BGMC 15.105.140.

STANDARD FIRE PROTECTION BACKFLOW INSTALLATION LOCATIONS

PLAN #

CITY OF BATTLE GROUND APPROVED

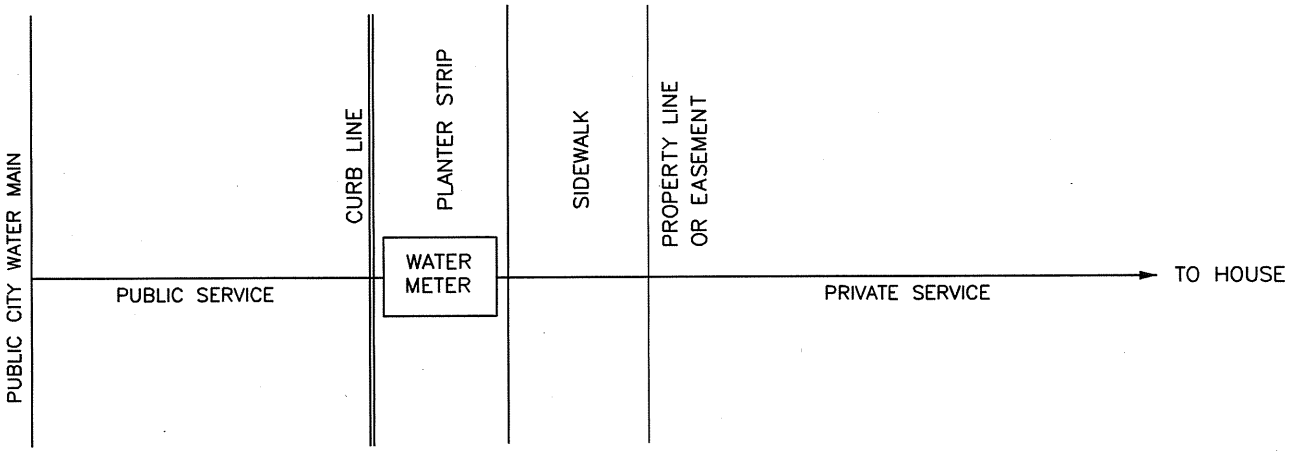
9/24/07

CITY ENGINEER — DATE

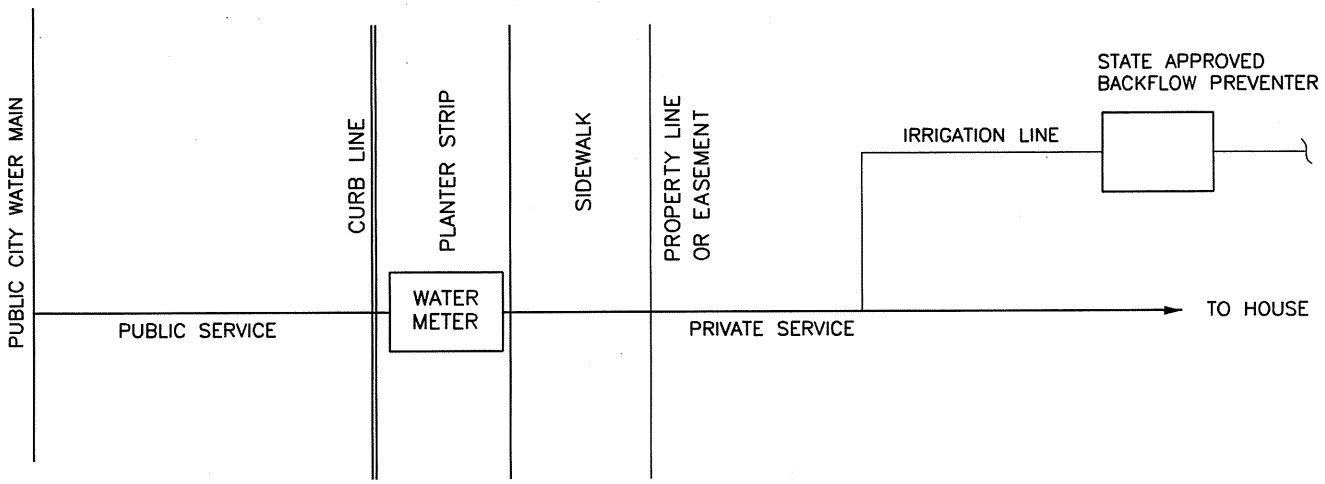
REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH
2	9/24/07	MCH	MCH

WA-6.0

SINGLE-FAMILY WATER METER INSTALLATION LOCATION



SINGLE-FAMILY WATER METER/DCVA LOCATION FOR IRRIGATION LINE INSTALLATION

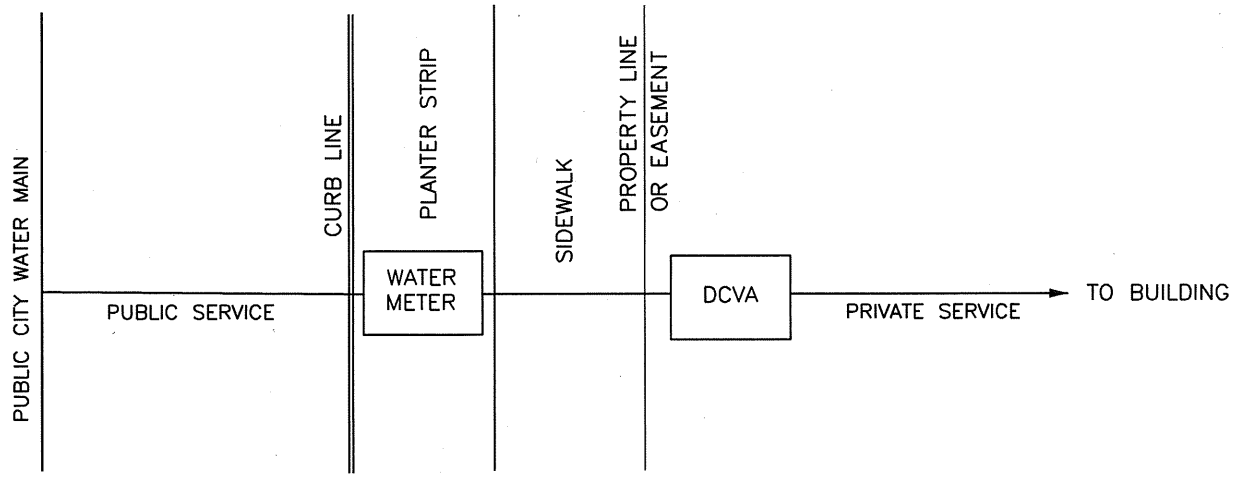


NOTES:

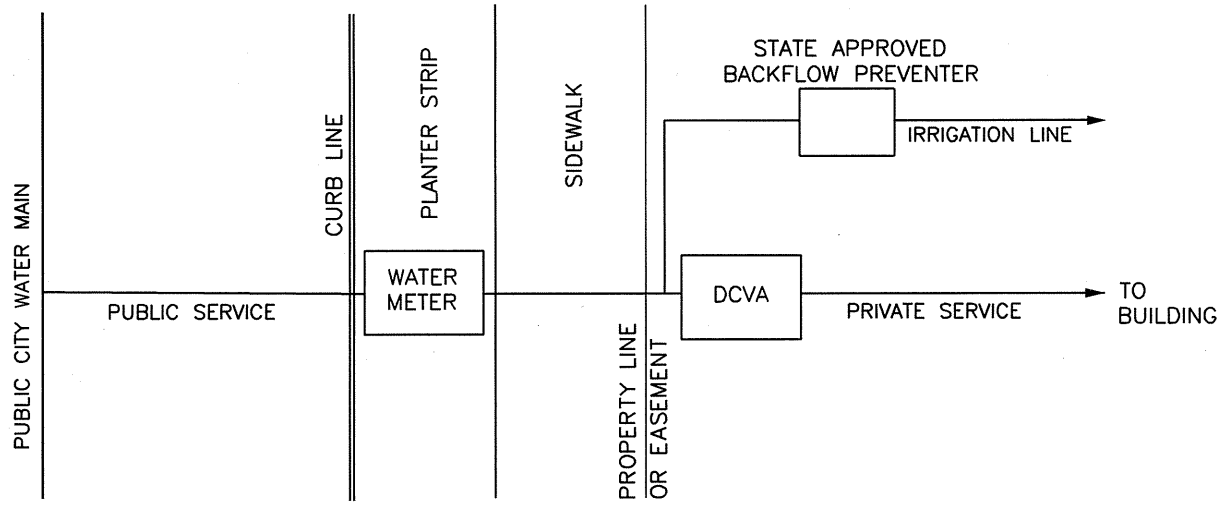
1. DOMESTIC SERVICES SHALL BE TAPPED FROM MAIN LINES AND NOT FROM FIRE PROTECTION AND OR HYDRANT LINES.
2. AN IRRIGATION PERMIT FROM THE CITY OF BATTLE GROUND IS REQUIRED FOR ALL IRRIGATION SYSTEMS.
3. ALL BACKFLOW DEVICES ARE PRIVATELY OWNED AND MAINTAINED. BACKFLOW DEVICES MUST BE TESTED ANNUALLY BY A CERTIFIED BACKFLOW ASSEMBLY TESTER.

SINGLE-FAMILY WATER METER/BACKFLOW INSTALLATION LOCATIONS					PLAN #
THE CITY OF BATTLE GROUND	CITY OF BATTLE GROUND APPROVED CITY ENGINEER 9/24/07 DATE	REVISIONS:	DATE:	DRAWN:	DESIGNED:	WA-6.1
		1	4/16/07	JMH	MCH	
		2	9/24/07	MCH	MCH	

NON SINGLE-FAMILY WATER METER/DCVA INSTALLATION LOCATION



NON SINGLE-FAMILY WATER METER/DCVA INSTALLATION LOCATION W/IRRIGATION LINE



NOTES:

1. DOMESTIC SERVICES SHALL BE TAPPED FROM MAIN LINES AND NOT FROM FIRE PROTECTION OR HYDRANT LINES.
2. AN IRRIGATION PERMIT FROM THE CITY OF BATTLE GROUND IS REQUIRED FOR ALL IRRIGATION SYSTEMS.
3. ALL BACKFLOW DEVICES ARE PRIVATELY OWNED AND MAINTAINED. BACKFLOW DEVICES MUST BE TESTED ANNUALLY BY A CERTIFIED BACKFLOW ASSEMBLY TESTER.

NON SINGLE-FAMILY WATER METER/BACKFLOW INSTALLATION LOCATIONS	PLAN #

THE CITY OF BATTLE GROUND

CITY OF BATTLE GROUND
APPROVED

9/24/07

CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH
2	9/24/07	MCH	MCH

WA-6.2

TEST	SPECIFICATIONS	FREQUENCY	TESTING AGENCY	COMMENTS
S.G. CUT SEC. COMPACTION	AASHTO T-180	PROOF ROLL OR AS REQ'D BY CITY	CERTIFIED LAB	FIELD REPORTS REQ. PRIOR TO BASE ROCK
S.G. FILL COMPACTION	AASHTO T-180	EVERY 2500 CY MIN 2 @ 95%	CERTIFIED LAB	FIELD REPORTS REQ. PRIOR TO BASE ROCK
UTILITY BACKFILL COMPACT.	AASHTO T-180	AS REQUIRED BY CITY	CERTIFIED LAB	FOR FAILED TEST 2 @ 100 FT.,REPORTS PRIOR TO BASE ROCK 95%
EASEMENT UTIL. BACKFILL	AASHTO T-99	AS REQUIRED BY CITY	CERTIFIED LAB	PRIOR TO FINAL ACCEPTANCE 95%
LOT AREA COMPACTION	AASHTO T-99	MIN 1/ LOT FILL OVER 1'	CERTIFIED LAB	PRIOR TO FINAL ACCEPTANCE
BACTERIA WATER SAMPLE	AWWA	AS REQ'D. PER CITY	CITY OF BATTLE GROUND	PRIOR TO PRESSURE TEST &BASE ROCK
WATER PRESSURE TEST	WSDOT 7-11.3	MAIN, SERVICE, F.H.	CITY OF BATTLE GROUND	PRIOR TO BASE ROCK
P. SEWER PRESSURE TEST	WSDOT	MAIN, SERVICE, AIR/VAC	CERTIFIED LAB	PRIOR TO BASE ROCK
P. SEWER TONE TEST	WSDOT	MAIN, SERVICE	CERTIFIED LAB	PRIOR TO BASE ROCK
GRAV. SEWER AIR TEST	WSDOT 7-17.3	MAIN AND LATERALS	LAB/CONTRACTOR	PRIOR TO BASE ROCK
GRAV. SEWER VAC. TEST MH	WSDOT	AFTER INSTALLATION	LAB/CONTRACTOR	AFTER PAVEMENT INSTALLED
GRAV. SEWER MANDREL TEST	WSDOT 7-17.3	AFTER INSTALLATION	CONTRACTOR	PRIOR TO BASE ROCK
GRAV. SEWER TV TEST	WSDOT 7-17.3	AFTER INSTALLATION	CONTRACTOR	PRIOR TO PAVING
PRESSURE WASH SAN. SEWER	-	AS DIRECTED PER CITY	CONTRACTOR	AS DIRECTED PER CITY
ASE ROCK GRADING	WSDOT 9-03.9	ONE PER SOURCE	CERTIFIED LAB	PRIOR TO PLACEMENT
BASE ROCK COMPACTION	WSDOT T-180	95%	CERTIFIED LAB	
TOP ROCK GRADING	WSDOT 9-03.9	ONE PER SOURCE	CERTIFIED LAB	PRIOR TO PLACEMENT
TOP ROCK COMPACTION	AASHTO T-180	95%	CERTIFIED LAB	
AC GRADE & OIL CONTENT	WSDOT 9-03.8	ONE PER SOURCE	CERTIFIED LAB	PRIOR TO PLACEMENT
AC COMPACTION	WSDOT	95%	CERTIFIED LAB	
SUBGRADE GRADE CK ELEV	WSDOT	PER STATION (0+25)	CONTRACTOR	PRIOR TO ROCK
BASE ROCK GRADE CK ELEV	WSDOT	PER STATION (0+50)	CONTRACTOR	PRIOR TO TOP ROCK
TOP ROCK GRADE CK ELEV	WSDOT	PER STATION (0+50)	CONTRACTOR	PRIOR TO PAVEMENT
CONCRETE SLUMP AND STRENGTH TEST	WSDOT	ONE PER SOURCE	CERTIFIED LAB	

TESTING TYPE AND FREQUENCY

PLAN #

THE CITY OF BATTLE GROUND

CITY OF BATTLE GROUND
APPROVED

4/16/07

CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH

WA-7.0

N:\CAD Data\Standard Dwgs\Water Details\WA-7.0_Testing.dwg, 4/10/2007 9:22:15 AM